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HYDROGRAPHIC AND BIOLOGICAL OBSERVATIONS
ON THE WASHINGTON CONTINENTAL SHELF
AND SLOPE DURING THE PERIODS
30 MARCH - 5 APRIL, 8-15 JUNE, AND
6-11 SEPTEMBER 1978

Compiled by

James R. Postel
and
Willis K. Peterson

Department of Oceanography, WB-10
University of Washington
Seattle, Washington 98195

Prepared for

The U.S. Department of Energy
Contract No. DE-AT06-76-EV-75026

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January 1981

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George C. Anderson
Principal Investigator

D. James Baker, Jr.
Chairman
Department of Oceanography

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INTRODUCTION

During 1978 several cruises were successfully completed along a shelf-slope section off the Washington coast. These cruises were undertaken to collect seasonal information on the processes affecting phytoplankton production and distribution and data on the settling rate of organic matter in the sea during spring, early summer, and autumn conditions. The cruises were part of a continuing program to collect detailed information in nearshore waters, which has been sponsored by the Ecological Research Division of the U.S. Department of Energy. This report summarizes the data collected on three cruises aboard the R/V CAYUSE, which was operated by Oregon State University. Data from a fourth cruise in 1978, aboard the R/V THOMAS G. THOMPSON, can be found in a separate report (Postel, Peterson and Kitchen, 1980).

The cruises detailed here have been designated as follows:

CY-378: 30 March-5 April 1978

CY-678: 8-14 June 1978

CY-978: 6-11 September 1978

All three cruises originated and terminated in Newport, Oregon. Sampling was conducted at established station locations along a transect off Copalis Beach, Washington (Fig. 1-3). Water depth varied from about 10 m at the innermost station (~ 3 km from the beach) to over 1500 m at the outermost station (~ 120 km from the beach).

Figure 1. Location of the transect sampled during cruise CY-378 (30 March - 5 April 1978). The positions of stations 9-22 (+) and the sediment trap stations 15A-15C (♦) are shown.

Figure 2. Location of the transect sampled during cruise CY-678 (8-14 June 1978). The positions of stations 7-22 (+) and the sediment trap stations A15 and 15A (◇) are shown.

Figure 3. Location of the transect sampled during cruise CY-978 (6-11 September 1978). The positions of stations 7-20 (+) and the sediment trap stations A15 and 15A (O) are shown.

METHODS

Routine procedure at stations on the Copalis Line (approximately 47°07'N latitude) was to lower a CTD to 200-300 m or close to the bottom in shallower water. The CTD lowering was followed by a 10-bottle hydrographic cast using 2.5-l Niskin bottles. Special experiments, as described below, were done at selected stations.

CTD sampling

During cruise CY-378 a Plessey Environmental Systems model 9400 CTD and model 8400 data logger were used to collect conductivity, temperature, and depth data in the upper 200 m. For cruises CY-678 and CY-978 a Neil Brown Instrument Systems, Inc., Mark III CTD and Kennedy data logger were used; data were collected in the upper 300 m. In addition to conductivity, temperature, and depth, instrumentation was provided to monitor water transparency, submarine irradiance, and dissolved oxygen during CTD casts on cruise CY-978. The extra instruments were a beam transmissometer and an irradiance meter designed by the Oregon State University optics group and the standard Beckman oxygen probe that is an option with the Neil Brown CTD.

The instruments were lowered about 30 m (min)⁻¹. Both data loggers recorded the data as frequency counts from the various sensors onto magnetic tapes, which were subsequently read and converted to scientific units utilizing computer programs developed by the Computer Services Group, Department of Oceanography, University of Washington. The calibrations used were basically those supplied by the manufacturers, but field samples were collected during the cruises to verify the results by comparison with salinity samples from standard hydrographic casts and with temperatures and depths calculated from reversing thermometer readings.

Data files on the computer were created slightly differently dependent upon which CTD system was used. The Plessey system had a relatively slow temperature sensor response time (0.5 sec) and cycled 5 times per second. The original scan-by-scan data were processed through a subroutine that corrects for the temperature sensor lag to adjust the temperature term in the salinity calculation. All scans then contained corrected temperature, original depth and conductivity measurements, and recalculated salinity values. These corrected data were then plotted as continuous CTD profiles and were correlated with the standard hydrographic data. The Neil Brown CTD system, on the other hand, had a fast response (~ 0.03 sec) temperature sensor and recorded data at 8 scans per sec. No temperature lag adjustments were necessary for data collected by the Neil Brown CTD and only every 10th data scan was needed to obtain good resolution in the data.

After the initial processing, all data files were treated similarly; they were condensed by averaging data from scans within 0.1 m of each other and deleting scans associated with upward movement of the instrument or

erratic sensor signals (such as widely fluctuating conductivity or transmission data near the surface, where the instrument would be bobbing in and out of the water). The edited data appear in the data tables section of this report.

Hydrographic sampling

At each station, discrete water samples were collected with 2.5-l Niskin bottles. Standard hydrographic casts were performed on cruise CY-378, and on cruises CY-678 and CY-978 a General Oceanics rosette sampler mounted above the CTD was used in collecting water samples. The CTD profiles were measured on the CTD downcast and discrete depths were sampled on the CTD upcast. Sampling depths were estimated from the digital pressure (dbar) display on the data logger and were verified by taking a few scans of CTD data before and after triggering the rosette sampler at each depth. Maximum hydrographic sampling depths were 200 m for CY-378, 150 m for CY-678, and 100 m for CY-978. Subsamples were drawn from each Niskin bottle for the determination of dissolved oxygen, phosphate, silicate, nitrate, nitrite, ammonia, chlorophyll α , phaeopigments, and phytoplankton species identification and enumeration. Two depths per station were also subsampled for microzooplankton species identification and enumeration.

From the deepest Niskin bottle at each station, a salinity sample was drawn for analysis using a conductivity bridge (Paquette, 1958), and paired temperature observations were made using reversing thermometers for verification of the CTD calibration.

A secchi disc lowering was made at all daylight stations. Incident radiation was monitored during the cruises using a Belfort recording pyrheliometer.

Oxygen

Dissolved oxygen was measured by titration on board the ship, using a modification of the method of Carpenter (1965); the reagent concentrations were adjusted to reduce iodine volatilization. Weiss's (1970) equations and interpolated values of temperature and salinity from the CTD profiles were used to calculate the percent oxygen saturation and the apparent oxygen utilization (AOU) of the samples.

Nutrients

Nutrient samples were frozen in plastic bottles on shipboard. They were transported in dry ice back to the laboratory for analysis using a Technicon^R autoanalyzer. Samples were analyzed for nitrate, nitrite, ammonia, phosphate, and silicate using modifications of the methods described by Strickland and Parsons (1972) for autoanalyzer use (Pavlou, 1972).

Pigments

Chlorophyll α and phaeopigments were determined fluorometrically (Yentsch and Menzel, 1963; Holm-Hansen et al., 1965) on shipboard. Water samples (280 ml) were filtered immediately onto 25-mm diameter Whatman GF/C or Gelman A/E glass fiber filters, and pigments were extracted in 90% acetone. Cells were lysed by sonication at an indicated 400-500 μ amps output for 7 minutes using an Ultrasonic Instruments International, Inc., Megason ultrasonic disintegrator (model PG-300-20-1) and probe (model PA-300-20-1). Samples were placed in a stainless steel jacketed ice bath during sonication. The Turner Model 111 fluorometer was calibrated against spectrophotometrically determined chlorophyll extracts of phytoplankton cultures harvested during the log-phase of growth (Lorenzen, 1967). Several species were analyzed and the results were averaged to determine the calibration constants.

Species composition

Phytoplankton and microzooplankton samples were preserved in 1% (v/v) formalin that was buffered with sodium acetate [30 g ℓ^{-1} (UNESCO, 1974)]. Samples were stored in soft glass, screw-cap bottles in the dark. Those samples chosen for phytoplankton species identification and enumeration were examined using inverted microscope techniques (see Lund et al., 1958).

Experimental program

Phytoplankton productivity

At selected stations on each cruise, a large-volume (50 ℓ) non-toxic plastic water sampler was used to obtain water for ^{14}C uptake experiments, including nutrient and pigment concentration measurements. On the basis of transparency information from the secchi disc reading, light depths corresponding to 100, 50, 25, 10, and 1% of surface intensity were sampled. Basically, the methods described by Steemann Nielsen (1952) were used. Light and dark bottles from each depth were incubated about 24 hr under simulated in situ conditions in 125-ml pyrex reagent bottles. Running surface seawater cooled the samples in large water baths. Following incubation, the samples were filtered through 0.45- μ m pore size, 25-mm diameter Millipore HA filters and fumed for 15-20 seconds over concentrated HCl. The wet filters were placed in 10-ml aliquots of scintillation cocktail (5 g PPO, 0.5 g dimethyl POPOP and 100 ml Bio-solv BBS-3 per liter of toluene) and returned to the laboratory for counting with a Packard Instrument Co. model 3310 Liquid Scintillation Spectrometer.

Phytoplankton productivity was measured at the following stations:

CY-378: 009, 020, and 15C
 CY-678: 008, 019, 15A, and A15
 CY-978: 009, 020, and A15

Sediment traps

Sediment trap arrays were deployed during each cruise at a mid-shelf station in order to measure the daily flux of sinking material. A description of the traps is given by Shuman (1978). Each array consisted of two sediment traps attached to a taut mooring line in such a way that they remained vertical. The top trap was positioned ~ 50 m below the surface and the bottom trap was at ~ 60 m. The lids of the traps were closed by an electronic timer which activated an explosive cable cutter. Each mooring was recovered by releasing the anchor with an acoustic release. On board ship the following subsamples were taken from each sediment trap: pigments, particulate carbon, particulate nitrogen, and formalin-preserved samples for microscopic examination. Standard CTD and hydrographic casts were generally done in conjunction with each array deployment and recovery.

Acknowledgements

We wish to acknowledge the efforts of the other people who participated in these cruises and who collected and analyzed the samples. Scientific personnel who participated in the cruises are listed below in Appendix 2. Kathy Kroglund analyzed the nutrients and bottle salinity samples. Sean Chamberlin, Chris Campbell, Jon Mowe, and Carol Cayford counted the phytoplankton samples. David Menzies and Hella Lee provided assistance useful in reducing the data collected with the Neil Brown CTD, and Jean Newman helped with the final reduction and compilation of the CTD and hydrographic data. Dr. Mary Jane Perry provided editorial expertise. The contributions of all of these people towards preparing this report are sincerely appreciated.

References

- Carpenter, J.H. 1965. The Chesapeake Bay Institute technique for the Winkler dissolved oxygen method. *Limnol. Oceanogr.* 10: 141-143.
- Holm-Hansen, O., C.J. Lorenzen, R.W. Holmes, and J.D.H. Strickland. 1965. Fluorometric determination of chlorophyll. *J. Cons. Perm. int. Explor. Mer* 30: 3-15.
- Lorenzen, C.J. 1967. Determination of chlorophyll and phaeopigments: Spectrophotometric equations. *Limnol. Oceanogr.* 12: 343-346.
- Lund, J.W.G., C. Kipling, and E.D. LeCren. 1958. The inverted microscope method of estimating algal numbers and the statistical basis of estimations by counting. *Hydrobiologia* 16: 143-170.
- Paquette, R.G. 1958. A modification of the Wenner-Smith-Soule salinity bridge for the determination of salinity in seawater. Univ. Wash., Dept. Oceanogr. Tech. Rept. No. 61, Ref. M58-14. 57 pp.
- Pavlou, S.P. 1972. Phytoplankton growth dynamics. Tech. Series 1: Chemostat methodology and chemical analyses. Special Rept. No. 52. Dept. Oceanogr., Univ. Wash., Seattle. 130 pp.
- Postel, J.R., W.K. Peterson, and J.C. Kitchen. 1980. Data report of the DOE-sponsored Northwest Marine Sciences Group October 1978 cruise. Dept. Oceanogr., Univ. Wash., Seattle. Ref: A80-17. 126 pp.
- Shuman, F.R. 1978. The fate of phytoplankton chlorophyll in the euphotic zone--Washington coastal waters. Ph.D. Dissertation, Dept. Oceanogr., Univ. Wash., Seattle. 243 pp.
- Steemann Nielsen, E. 1952. The use of radioactive carbon (C^{14}) for measuring organic production in the sea. *J. Cons. Int. Explor. Mer* 10: 117-140.
- Strickland, J.D.H., and T.R. Parsons. 1972. A practical handbook of seawater analysis. Fish. Res. Bd. Canada Bull. 167. Second Edition, Ottawa. 310 pp.
- UNESCO. 1974. A review of methods used for quantitative phytoplankton studies: Final report of SCOR working group 33. Unesco Technical Papers in Marine Science 18. 27 pp.
- Weiss, R.F. 1970. The solubility of nitrogen, oxygen, and argon in water and seawater. *Deep-Sea Res.* 17: 721-735.
- Yentsch, C.S., and D.W. Menzel. 1963. A method for the determination of phytoplankton chlorophyll and phaeophytin by fluorescence. *Deep-Sea Res.* 10: 221-231.

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Section Plots of Measured Variables

Computer-generated contoured section plots are presented to give a visual representation of the distribution of the physical, chemical, and biological parameters along the sampling section. Plots are arranged to facilitate comparison of the distributions of each variable during the three cruises, and the same contour levels were chosen for all cruises for any given variable.

The CTD and bottle cast data presented in the next section were used to produce these contour plots. Samples were collected at locations shown as dots on the plots. The data were linearly interpolated at selected depths within stations and then at selected intervals between stations to produce a regularly-spaced grid of data used by a computer contouring subroutine (CONLI) available in the graphics library at the University of Washington Academic Computer Center. The step transitions seen in the bottom profiles at the inshore stations are artifacts of the grid spacing, which was chosen to be every fourth meter and every third minute of longitude for these plots.

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CTD Plots and Data Tables

Vertical profiles are presented for each CTD cast made during the cruises. One plot shows the temperature ($^{\circ}\text{C}$), salinity (‰), and sigma-t profile at the station. For cruise CY-978, a second plot shows the optical transmission (%), dissolved oxygen concentration (ml l^{-1}), and measured irradiance ($\log_{10}[\text{microwatts cm}^{-2}]$) in the water column. For irradiance, the useful range of the sensor is 1.8 to $-4.2 \log_{10}$ units.

The CTD plots and data tables for each standard station are presented together in order to consolidate as much synoptic data as possible for the station. An explanation of the data tables follows below. Data for casts at locations where sediment traps were deployed are in a separate section of the report pertaining to sediment trap results.

The irradiance traces are included even for the nighttime casts. Part of the sensor signal may have been a response to the light at the end of the boom used to lower the instrument, and part of the sensor signal was a response to the true irradiance at night. No attempt has been made to quantify the separate effects or to determine whether the instrument was lowered on the side of the ship affected by the ship's shadow or on the side not affected by the shadow.

Explanation of Data Table Headings

Each station's data have been presented in tabular format on the following pages. Most of the heading information is readily understandable, but brief explanations of the various abbreviations and units of measurement are presented here. Blanks indicate missing observations; zeroes are measured values.

General Heading Information:

CRUISE	- Ship and local cruise designation: CY = R/V CAYUSE
STATION	- Numerical station designation within the given cruise
DATE	- Local date: day, month, year
TIME	- Local time of CTD cast or messenger drop; local time zone relative to GMT is in parentheses
LAT and LON	- Latitude and longitude of station in degrees and minutes
DEPTH	- Water column depth, in meters
SECCHI	- Secchi disk reading, in meters
PHOTIC	- Estimated 1% light depth = $2.7 \times \text{Secchi}$, in meters
SUN AM, PM, and TOTAL	- Solar radiation in $\text{langley} \cdot \text{m}^{-2} \cdot \text{sec}^{-1}$ AM = sunrise to local apparent noon PM = local apparent noon to sunset TOTAL = sunrise to sunset
WIND SPD and DIR	- Wind speed in knots and wind direction in degrees true
WAVE HGT, DIR, and PER	- Swell height in meters, direction in degrees true, and period in seconds
BAROMETER	- Barometric pressure in millibars
AIR DRY and WET	- Dry bulb and wet bulb air temperature readings in degrees Celsius
REL HUMIDITY	- Relative humidity in per cent
SURF TEMP	- Surface temperature in degrees Celsius

CLOUD TYPE and AMOUNT

- Dominant cloud type and percentage of sky covered

WEATHER

- Weather conditions at station, based on World Meteorological Organization code 4501

VISIBILITY

- Visibility from ship's bridge

TIDE

- Estimated tidal height in meters and tide stage based on data for Pacific Beach, Washington. Tide was estimated only for stations having ≤ 50 m of water.

Standard Parameters:

DEPTH

- Depth sampled, in meters, based on CTD readout or estimated wire out

TEMP

- Water temperature, in degrees Celsius

SAL

- Salinity, in parts per thousand

SIG-T

- Sigma-t, an expression for the density of seawater at atmospheric pressure, having the indicated temperature and salinity:
 $\sigma_t = (\text{density}-1) \times 10^{-3}$

OXYGEN

- Dissolved oxygen concentration in milligram-atoms per liter (MGAT/L) and milliliters per liter (ML/L); per cent of oxygen saturation (SAT) and apparent oxygen utilization (AOU)--in milligram-atoms per liter--are also presented when temperature and salinity data were available.

PHOS, SIL, NO₃, NO₂, NH₃

- Concentrations of phosphate, silicate, nitrate, nitrite, and ammonia, respectively, all in microgram-atoms per liter

CHLA and PHAEO

- Concentrations of chlorophyll-*a* and phaeopigments in milligrams per cubic meter

FO/FA

- Ratio of fluorescence readings of pigment extracts before:after acidification

C-14 DEPTH

- Sampling depths at which primary productivity measurements were made using ¹⁴C techniques, in meters

LIGHT DEPTH, %

- Per cent of maximum irradiance sample received if attenuated with neutral density screens or incubated at depths other than one sampled

SIMULATED IN SITU,
IN SITU, or CONSTANT
LIGHT

- Type of incubation used to measure ^{14}C production (results of dark bottle have been subtracted from the light bottle) of samples

-CARBON ASSIM-
LIGHT DARK

- ^{14}C production measured in light and dark bottles. Units depend on the incubation period and are milligrams carbon per cubic meter per incubation period (shown in parentheses). Normal incubation period designations are:

LAN-SS: local apparent noon to sunset

SR-SS: sunrise to sunset

SR-LAN: sunrise to local apparent noon

SR-SR: sunrise to sunrise

INCUB*: non-standard period specified in comments

HOURL: hour

ASSIM/CHLA

- ^{14}C assimilation per unit chlorophyll- α , in milligrams carbon assimilated per milligram chlorophyll- α per hour of light

(0 - xxx.x M)

- Concentrations of chlorophyll- α and phaeopigments in milligrams per meter squared and ^{14}C assimilation in milligrams C per meter squared per designated incubation period, integrated from the surface to the indicated depth (usually the estimated 1% light depth)

COMMENTS

- Any information pertinent to interpreting the data at a particular station is given in the form of comments at the bottom of the table for that station.

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-----CRUISE CY378

STATION 009-----

DATE 31 MAR 78 SECCHI 16.0M WIND SPD 10KT BAROMETER 1009.5MB CLOUD TYPE: CIRRUS
 TIME 1300(+08) PHOTIC 43.0M DIR 330 AIR DRY C AMOUNT: 60%
 LAT 47-07.0N SUN AM LY WAVE HGT 2M WET C WEATHER: PARTLY CLOUDY
 LON 125-31.0W PM LY DIR 310 REL HUMIDITY % VISIBILITY: 20-50KM
 DEPTH M TOTAL LY PER SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL O/CO	SIG-T	-----OXYGEN----- MGAT/L ML/L SAT	ADU	PHOS ---MICROGRAM-ATOMS/LITER---	SIL	NO3	NO2	NH3	CHLA ---MG/M3---	PHAEO	FD/FA
1.0		31.448				.36	2.15	.02	.07	.00	.20	.01	1.76
7.0		31.436				.35	1.89	.00	.08	.01	.25	.00	1.82
13.0		31.451				.35	1.89	.00	.19	.05			
22.0		32.464									.60	.02	1.77
40.0		32.558				.65	10.51	.00	.15	.00	.35	.13	1.59
(0-43.0M)											17.53	1.93MG/M2	

C-14 DEPTH M	CHLA ---MG/M3---	PHAEO	FD/FA	-----SIMULATED IN SITU----- LIGHT -CARBON ASSIM- ASSIM/CHLA DEPTH LIGHT DARK MG/MG/(HR % MG/M3/(INCUB*) CF LIGHT)
1.0	.20	.01	1.76	
7.0	.25	.00	1.82	
13.0				
22.0	.60	.02	1.77	10. 23.78 .56 3.08
40.0	.35	.13	1.59	1. 1.49 .37 .33
(0-43.0M)	17.53	1.93MG/M2		MGC/M2/(INCUB*)

SAMPLES INCUBATED FROM 1300, 31 MARCH TO 1300, 1 APRIL, INCLUDING
 12.85 HR. OF DAYLIGHT.
 1% LIGHT DEPTH ESTIMATED
 SALINITIES ESTIMATED FROM CTD DOWNCAST

STD PLOT
CY378 009

Latitude 47-07.0N
Longitude 125-50.5W
Program run: PLOT, ATLAS, PRINT, PLOT

File: MN3009

Date: 31 MAR. 1976
Begin: 1515

-----CRUISE CY378

STATION 009-----

DATE 31 MAR 78 SECCHI 16.0M WIND SPD 10KT BAROMETER 1009.5MB CLOUD TYPE: CIRRUS
 TIME 1620(+08) PHOTIC 43.2M DIR 330 AIR DRY C AMOUNT: 60%
 LAT 47-07.0N SUN AM LY WAVE HGT 2M WET C WEATHER: PARTLY CLOUDY
 LON 125-30.9W PM LY DIR 310 REL HUMIDITY % VISIBILITY: 20-50KM
 DEPTH M TOTAL LY PER SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS	SIL	NO3	NO2	NH3	CHLA	PHAEO	FO/FA
				MGAT/L	ML/L	SAT	ACU	---	---	---	---	---	---	---	---
0.0	10.89	31.448	24.06	.587	6.57	104	-.021	.36	1.89	.00	.00	.02	.20	.02	1.73
10.0	10.89	31.440	24.05	.596	6.67	105	-.030	.36	1.89	.00	.02	.05	.23	.00	1.82
20.0	10.57	32.419	24.86	.593	6.33	105	-.027	.48	2.60	.28	.23	.01	1.13	.02	1.79
30.0	10.58	32.568	24.98	.592	6.62	105	-.026	.58	3.65	1.66	.24	.06	.51	.04	1.74
40.0	10.11	32.565	25.08	.568	6.59	103	-.016	.60	3.58	1.54	.24	.00	.51	.12	1.64
50.0	9.89	32.582	25.11	.556	6.23	97	.018	.72	5.94	3.42	.21	.00	.28	.11	1.57
75.0	9.51	32.642	25.22	.471	5.27	81	.018	.90	8.54	5.31	.21	.00	.07	.10	1.34
100.0	8.78	32.910	25.54	.463	5.52	84	.094	1.19	15.65	11.41	.16	.00	.04	.09	1.24
150.0				.397	4.44			1.69	29.80	20.80	.14	.00	.01	.06	1.12
200.0	6.90	33.812	26.52	.320	3.59	52	.290	1.90	39.92	25.60	.19	.00	.01	.04	1.17
(0- 43.2M)													23.76	1.68MG/M2	

200M TEMPERATURE, SALINITY AND SIGMA-T FROM WATER BOTTLE SAMPLES.

STD PLOT CY378 010

T = Temperature - C
S = Salinity - 0/00
D = Sigma-t
F = S-V or Chlorophyll

Latitude 47-05.5N
Longitude 125-23.5W
Program run: PLCTD, ATLAS, REMOT

File: MN3010

Date: 31 MAR. 1978
Begin: 1730

-----CRUISE CY378

STATION 010-----

DATE 31 MAR 78 SECCHI 15.0M WIND SPD 10KT BAROMETER 1005.5MB CLOUD TYPE: ALTOCUMULUS
 TIME 1830(+08) PHOTIC 40.5M DIR 330 AIR DRY C AMOUNT: 60%
 LAT 47-06.5N SUN AM LY WAVE HGT 2M WET C WEATHER: PARTLY CLOUDY
 LON 125-23.3W PM LY DIR 300 REL HUMIDITY % VISIBILITY: 10-20KM
 DEPTH M TOTAL LY PER 6SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS	SIL	NO3	NO2	NH3	CHLA	PHAEO	FO/FA
				MGAT/L	ML/L	SAT	AQU	---MICROGRAM---	---ATOMS/LITER---				---MG/M3---		
0.0	10.89	31.525	24.12	.610	6.83	108	-.045	.31	2.21	.00	.14	.00	.14	.02	1.71
10.0	10.88	31.532	24.12	.502	6.74	106	-.036	.35	1.89	.00	.14	.15	.15	.00	1.82
20.0	10.86	31.771	24.31	.507	6.79	107	-.042	.45	2.08	.00	.14	1.98	.13	.02	1.71
30.0	10.89	32.597	24.95	.507	6.80	108	-.045	.46	2.99	.13	.21	.05	.39	.06	1.69
40.0	10.71	32.622	25.00	.591	6.62	105	-.027	.57	3.71	1.42	.22	.10	.67	.11	1.68
50.0	10.43	32.620	25.05	.564	6.31	99	.033	.60	4.18	1.72	.21	.21	.11	.05	1.56
75.0	9.47	32.583	25.18	.554	6.20	96	.026	.79	8.75	4.94	.19	.03	.03	.05	1.28
100.0	9.14	32.916	25.49	.485	5.43	83	.098	1.08	14.10	9.79	.17	.08	.02	.06	1.19
149.0	7.27	33.422	26.16	.414	4.64	68	.192	1.61	28.06	19.26	.18	.00	.02	.05	1.20
199.0	7.28	33.836	26.49	.286	3.20	47	.318	1.99	40.05	26.30	.17	.02	.01	.03	1.20
(0- 40.5M)													11.08	1.50MG/M2	

STD PLOT
CY378 011

T = Temperature - C
S = Salinity - g/kg
D = Sigma-t
F = S-V or Chlorophyll

Latitude 47-07.0N
Longitude 125-16.1W
Program run: PLCTD: RTUC: 0307

File MN3011

Date 31 MAR. 1978
Begin 1830

-----CRUISE CY378

STATION 011-----

DATE 31 MAR 78 SECCHI M WIND SPD 10KT BAROMETER 1005.5MB CLOUD TYPE: ALTOCUMULUS
 TIME 2012(+08) PHOTIC M DIR 300 AIR DRY C AMOUNT: 70%
 LAT 47-07.0N SUN AM LY WAVE HGT 2M WET C WEATHER: PARTLY CLOUDY
 LON 125-16.4W PM LY DIR 330 REL HUMIDITY % VISIBILITY: 10-20KM
 DEPTH M TOTAL LY PER 6SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL 0/00	SIG-T	-----OXYGEN-----				PHOS --MICROGRAM--	SIL	NO3 -ATOMS/LITER---	NO2	NH3	CHLA ---MG/M3---	PHAED	FO/FA
				MGAT/L	ML/L	SAT	AOU								
0.0	10.63	32.105	24.61	.585	6.55	103	-.018	.41	2.40	.01	.01	.00	.28	.04	1.70
10.0	10.63	32.107	24.61	.610	6.82	108	-.043	.38	2.34	.01	.01	.00	.32	.04	1.72
20.0	10.63	32.110	24.62	.599	6.70	106	-.032	.41	3.25	.04	.01	.00	.42	.06	1.71
30.0	10.05	32.414	24.95	.584	6.54	102	-.011	.59	3.05	1.19	.12	.10	.48	.13	1.63
40.0	10.45	32.613	25.04					.67	3.71	1.14	.24	.26	.26	.13	1.54
50.0	10.36	32.621	25.06	.605	6.78	106	-.037	.68	4.51	2.12	.26	.16	.10	.09	1.43
75.0	9.53	32.606	52.18	.588	6.59	102	-.009	.74	6.49	3.13	.25	.12	.09	.10	1.37
100.0	9.39	32.797	25.36	.505	5.66	87	.075	1.16	14.52	10.26	.13	.00	.03	.10	1.21
149.0	7.41	33.490	26.20	.401	4.49	66	.203	1.68	29.91	20.58	.08	.00	.01	.04	1.18
199.0	7.44	33.815	26.45	.289	3.23	48	.313	2.03	41.69	26.77	.08	.00	.01	.05	1.08

STD PLOT
CY378 012

T = Temperature - C
S = Salinity - g/kg
D = Sigma-t
F = S-V or Chlorophyll

Latitude 47-07.0N
Longitude 125-08.0W
Program run: PLOT, RTLD, PRINT

File MN3012

Date 31 MAR. 1978
Page 2125

-----CRUISE CY378

STATION 012-----

DATE 31 MAR 78 SECCHI M WIND SPD 12KT BAROMETER 1005.8MB CLOUD TYPE: STRATOCUMULUS
 TIME 2206(+08) PHOTIC M DIR 300 AIR DRY C AMOUNT: 70%
 LAT 47-07.0N SUN AM LY WAVE HGT 2M WET C WEATHER: PARTLY CLOUDY
 LON 125-09.0W PM LY DIR 300 REL HUMIDITY % VISIBILITY: 10-20KM
 DEPTH M TOTAL LY PER 6SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS --MICROGRAM--	SIL ATOMS/LITER--	NO3 --	NO2 --	NH3 --	CHLA --MG/M3--	PHAED --	FO/FA
				MGAT/L	ML/L	SAT	AOU								
0.0	10.60	31.907	24.46	.612	6.86	108	-.044	.36	1.51	.06	.02	.01	.23	.00	1.81
10.0	10.60	31.914	24.47					.35	1.49	.03	.00	.00	.20	.00	1.79
20.0	10.53	32.445	24.89	.609	6.82	107	-.042	.57	3.43	2.11	.17	.00	.66	.01	1.79
30.0	10.37	32.585	25.03	.596	6.67	105	-.028	.56	2.17	1.28	.17	.16	.82	.12	1.70
40.0	10.33	32.622	25.06	.585	6.55	103	-.016	.61	2.74	1.72	.17	.05	.23	.11	1.54
50.0	9.80	32.621	25.15	.591	6.62	103	-.016	.66	4.11	2.67	.17	.32	.11	.08	1.46
75.0	9.52	32.656	25.22	.505	5.65	87	.074	.74	6.08	4.52	.15	.06	.04	.05	1.37
100.0	8.98	32.773	25.40	.502	5.62	86	.083	1.00	10.83	8.69	.20	.00	.05	.06	1.36
150.0	7.70	33.595	26.24	.373	4.18	62	.226	1.76	29.26	22.46	.13	.00	.01	.07	1.12
200.0	7.39	33.899	26.52	.272	3.04	45	.330	2.04	37.65	26.50	.07	.00	.01	.04	1.09

STD PLOT
CY378 013

T = Temperature - C
S = Salinity - 0/00
D = Sigma-t
F = S-V or Chlorophyll

Latitude 47-07.0N
Longitude 125-01.7W
Program run: PLCTD, ATLAS, PRINT

File MN3013

Date 31 MAR. 1978
Begin 2305

-----CRUISE CY378

STATION 013-----

DATE 31 MAR 78 SECCHI M WIND SPD 12KT BARMETER 1006.5MB CLOUD TYPE: STRATOCUMULUS
 TIME 2345(+08) PHOTIC M DIR 300 AIR DRY C AMOUNT: 70%
 LAT 47-07.0N SUN AM LY WAVE HGT 2M WET C WEATHER: PARTLY CLOUDY
 LON 125-01.7W PM LY DIR 300 REL HUMIDITY % VISIBILITY: 10-20KM
 DEPTH M TOTAL LY PER 6SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS --MICROGRAM--	SIL --ATOMS/LITER--	NO3 --	NO2 --	NH3 --	CHLA --MG/M3--	PHAEO --	FO/FA
				MGAT/L	ML/L	SAT	AOU								
0.0	10.59	32.014	24.55	.608	6.81	107	-.041	.39	1.91	.01	.02	.00	.41	.00	1.89
10.0	10.59	32.081	24.60	.601	6.73	106	-.034	.39	2.08	.02	.01	.00	.46	.07	1.69
20.0	10.39	32.202	24.73	.612	6.86	107	-.043	.39	2.33	.10	.01	.09	.36	.09	1.64
30.0	10.19	32.466	24.97	.596	6.67	104	-.025	.54	3.22	1.72	.17	.09	.46	.20	1.56
40.0	10.05	32.586	25.08	.594	6.66	104	-.022	.60	3.06	2.11	.17	.27	.31	.23	1.46
50.0	9.84	32.600	25.13	.589	6.60	102	-.014	.64	3.82	2.85	.17	.12	.25	.09	1.58
75.0	9.11	32.598	25.24	.594	6.65	102	-.010	.75	5.91	4.37	.17	.13	.13	.05	1.58
100.0	8.98	32.796	25.42	.542	6.06	93	.043	1.01	11.40	9.30	.15	.00	.06	.06	1.40
150.0	7.57	33.597	26.26	.350	3.92	58	.251	1.77	28.95	22.76	.11	.00	.02	.05	1.21
200.0	7.31	33.904	26.53	.275	3.08	46	.329	2.11	39.07	28.53	.07	.00	.01	.05	1.08

STD PLOT
CY378 014

T = Temperature - C
S = Salinity - 0/00
D = Sigma-t
F = S-V or Chlorophyll

Latitude 47-07.0N
Longitude 124-54.5W
Program run: PLOTD, ATLAS, REBOT

File MN3014

Date 1 APR. 1978
Begin 150

-----CRUISE CY378

STATION 014-----

DATE 01 APR 78 SECCHI M WIND SPD 7KT BARMETER 1005.0MB CLOUD TYPE: ALTOCUMULUS
 TIME 0247(+08) PHOTIC M DIR 270 AIR DRY C AMOUNT: 60%
 LAT 47-07.0N SUN AM LY WAVE HGT 2M WET C WEATHER: PARTLY CLOUDY
 LON 124-54.5W PM LY DIR 300 REL HUMIDITY % VISIBILITY: 20-50KM
 DEPTH 154M TOTAL 178LY PER 6SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS --MICROGRAM--	SIL	NO3 -ATOMS/LITER-	NO2	NH3	CHLA ---MG/M3---	PHAEO	FO/FA
				MGAT/L	ML/L	SAT	AQU								
0.0	10.29	31.925	24.53	.612	6.85	107	-.041	.39	5.52	.00	.00	.00	.58	.00	1.80
5.0	10.29	31.924	24.53	.603	6.75	105	-.031	.39	5.51	.00	.00	.00	.62	.00	1.81
10.0	10.30	31.924	24.52	.602	6.74	105	-.031	.39	1.98	.00	.00	.00	.55	.00	1.80
20.0	9.91	32.101	24.73	.593	6.64	103	-.017	.46	2.94	1.03	.01	.30	.67	.01	1.79
30.0	9.74	32.307	24.92	.585	6.55	101	-.008	.57	2.79	1.56	.16	.33	.53	.09	1.68
40.0	9.78	32.474	25.04	.589	6.59	102	-.013	.57	2.78	1.65	.21	.17	.72	.14	1.67
50.0	9.72	32.520	25.08	.570	6.38	99	.007	.67	4.75	3.45	.27	.07	.30	.08	1.63
75.0	9.21	32.665	25.28	.546	6.11	94	.037	.45	8.57	6.86	.34	.01	.05	.10	1.27
100.0	8.69	32.914	25.56	.486	5.44	83	.103	1.26	15.85	13.43	.16	.00	.03	.11	1.19
125.0	8.05	33.406	26.04	.356	3.99	60	.239	1.76	28.22	22.16	.16	.00	.02	.12	1.13

STD PLOT
CY378 015

T = Temperature - C
S = Salinity - ‰
D = Sigma-t
F = F-V or Chlorophyll

Latitude 47-07.0N
Longitude 129-47.2W
Program run: PLOT, ATLAS, REPORT

File HN3015

Date 1 APR 1978
Sigs 390

-----CRUISE CY378 STATION 015-----

DATE 01 APR 78 SECCHI M WIND SPD KT BAROMETER MB CLOUD TYPE:
 TIME 0420(+08) PHOTIC M AIR DRY C AMOUNT: %
 LAT 47-07.0N SUN AM LY WAVE HGT M WET C WEATHER:
 LON 124-47.2W PM LY DIR PER SEC REL HUMIDITY % VISIBILITY:
 DEPTH 124M TOTAL 178LY SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS	SIL	NO3	NO2	NH3	CHLA	PHAED	FD/FA
				MGAT/L	ML/L	SAT	AOU	---MICROGRAM---	---ATOMS/LITER---				---MG/M3---		
0.0	10.49	30.242	23.19	.593	6.64	103	-.018	.37	4.71	.00	.00	.06	.74	.00	1.82
10.0	10.62	31.114	23.84	.571	6.40	100	-.001	.33	2.42	.00	.01	.08	.62	.00	1.80
15.0	10.38	31.812	24.43	.590	6.61	103	-.019	.37	2.38	.00	.01	.29	.46	.04	1.74
20.0	10.26	31.960	24.56	.611	6.84	107	-.039	.34	2.12	.00	.01	.16	.55	.02	1.78
25.0	10.12	32.097	24.69	.601	6.72	105	-.028	.39	2.58	.19	.07	.35	.74	.02	1.78
30.0	10.04	32.240	24.82	.589	6.60	103	-.015	.54	3.04	1.00	.24	.65	.44	.10	1.65
40.0	9.76	32.381	24.97	.584	6.53	101	-.007	.63	4.05	2.61	.25	.52	.30	.09	1.62
50.0	9.72	32.505	25.08	.579	6.48	100	-.002	.67	4.59	3.23	.24	.33	.22	.06	1.64
75.0	9.34	32.567	25.18	.576	6.44	99	.005	.69	6.30	4.05	.07	.32	.09	.06	1.47
100.0	8.73	32.951	25.59	.440	4.93	75	.148	1.24	17.97	13.79	.00	.12	.05	.12	1.23

STD PLOT
CY378 016

T = Temperature - C
S = Salinity - 0/00
D = Sigma-t
F = S-V or Chlorophyll

Lat/Long 47-07.0N
Longitude 124-10.0W
Program run: PLOTD, ATLAS, RNDOT

File HN3016

Date 1 APR 1978
Depth 503

-----CRUISE CY378

STATION 016-----

DATE 01 APR 76 SECCHI M WIND SPD KT BAROMETER 1004.8MB CLOUD TYPE: STRATOCUMULUS
 TIME 0537(+081) PHOTIC M WIND DIR KT AIR DRY C AMOUNT: 100%
 LAT 47-07.0N SUN AM LY WAVE HGT 1M WET C WEATHER: UNBROKEN CLOUD LAYER
 LON 124-40.0W PM LY DIR 240 REL HUMIDITY % VISIBILITY: 10-20KM
 DEPTH M TOTAL 178LY PER 6SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS	SIL	NO3	NO2	NH3	CHLA	PHAEO	FO/FA
				MGAT/L	ML/L	SAT	ADU	---MICROGRAM---	---ATOMS/LITER---				---MG/M3---		
0.0	10.62	29.324	22.45					.30	5.69	.00	.00	.22	.45	.00	1.82
5.0	10.62	29.327	22.46	.600	6.72	104	-.023	.29	3.52	.00	.00	.21	.26	.00	1.79
10.0	10.61	30.891	23.67	.609	6.82	107	-.038	.34	1.81	.00	.00	.16	.16	.02	1.70
15.0	10.39	31.889	24.48	.610	6.84	107	-.040	.31	2.07	.00	.00	.13	.26	.06	1.66
20.0	10.23	32.005	24.60	.602	6.74	105	-.030	.40	2.73	.30	.00	.14	.74	.08	1.72
30.0	10.04	32.008	24.70	.603	6.76	105	-.029	.39	3.06	.41	.00	.15	.50	.12	1.64
40.0	9.86	32.284	24.88	.599	6.71	104	-.023	.46	2.53	.54	.12	.41	.39	.23	1.50
50.0	9.64	32.466	25.06	.576	6.45	100	.002	.66	4.74	2.79	.08	.24	.06	.06	1.41
75.0	9.28	32.616	25.23	.506	5.66	87	.076	.96	12.52	8.27	.04	.00	.06	.14	1.24
85.0	8.96	32.832	25.45	.478	5.35	82	.107	1.11	15.97	10.98	.10	.00	.03	.09	1.20

STD PLOT CY378 017

T = Temperature - C
S = Salinity - 0/00
D = Sigma-t
F = S-V or Chlorophyll

Latitude 47-07.0N
Longitude 124-32.5W
Program run: PLCTD. READ. PLOT

File MN3017

Date 1 APR. 1978
Begin 600

-----CRUISE CY378

STATION 017-----

DATE 01 APR 78 SECCHI 8.0M WIND SPD KT BAROMETER 1004.9MB CLOUD TYPE: STRATOCUMULUS
 TIME 0648(+08) PHOTIC 21.6M DIR AIR DRY C AMOUNT: 90%
 LAT 47-07.0N SUN AM LY WAVE HGT 1M WET C WEATHER: UNBROKEN CLOUD LAYER
 LON 124-32.5W PM LY DIR 300 REL HUMIDITY % VISIBILITY: 10-20KM
 DEPTH 73M TOTAL 178LY PER 6SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS	SIL	NO3	NO2	NH3	CHLA	PHAED	FO/FA
				MGAT/L	ML/L	SAT	AUU	---MICROGRAM---	---ATOMS/LITER---				---MG/M3---		
0.0	10.64	28.896	22.12	.587	6.57	102	-.009	.18	5.09	.00	.00	.09	.56	.05	1.73
5.0	10.63	28.904	22.12	.615	6.88	106	-.037	.19	5.16	.00	.00	.06	.62	.02	1.78
10.0	10.67	28.924	22.14	.607	6.80	105	-.029	.19	4.75	.00	.00	.07	.59	.03	1.76
15.0	10.54	30.304	23.23	.584	6.54	102	-.010	.29	3.07	.09	.01	.12	.85	.06	1.75
20.0	10.36	31.225	23.97	.582	6.52	102	-.009	.39	3.41	.45	.00	.40	.75	.26	1.59
30.0	10.11	32.002	24.62	.611	6.84	107	-.037	.35	2.49	.00	.15	.29	.14	.05	1.60
39.0	9.89	32.290	24.88	.575	6.44	100	.000	.53	3.81	1.33	.16	.34	.22	.12	1.52
49.0	9.69	32.458	25.04	.504	5.65	87	.073	.93	13.16	6.71	.14	.06	.26	.47	1.26
59.0	9.19	32.703	25.31	.512	5.74	88	.071	.99	13.17	8.50	.14	.07	.07	.14	1.26
69.0	8.92	32.879	25.49	.460	5.15	79	.126	1.28	20.45	11.58	.26	.08	.14	.30	1.26
(0- 21.6M)													14.70	1.71MG/M2	

STD PLOT
CY378 018

T = Temperature - C
S = Salinity - g/kg
D = Sigma-t
F = G-Y or Chlorophyll

Lat/Long: 47-07.0N
Longitude: 124-25.6W
Program run: PLOT, ATLAS, GNET

File: MN3018

Date: 1 APR. 1978
Page: 753

-----CRUISE CY378

STATION 018-----

DATE 01 APR 78 SECCHI 8.0M WIND SPD 5KT BAROMETER 1005.0MB CLOUD TYPE: STRATOCUMULUS
 TIME 0815(+08) PHOTIC 21.6M WIND DIR 230 AIR DRY C AMOUNT: 100%
 LAT 47-07.0N SUN AM LY WAVE HGT 2M WET C WEATHER: UNBROKEN CLOUD LAYER
 LON 124-26.8W PM LY DIR 300 REL HUMIDITY % VISIBILITY: 10-20KM
 DEPTH 49M TOTAL 178LY PER 6SEC SURF TEMP C TIDE: 1.8M EBB

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS	SIL	NO3	NO2	NH3	CHLA	PHAED	FD/FA
				MGAT/L	ML/L	SAT	AQU	--MICROGRAM-ATOMS/LITER--					---MG/M3---		
0.0	10.62	28.263	21.63	.623	6.98	107	-.042	.20	7.83	.00	.00	.13	.54	.00	1.81
3.0	10.63	28.264	21.63	.615	6.88	106	-.034	.17	7.81	.00	.00	.17	.36	.00	1.80
6.0	10.62	28.482	21.80	.613	6.86	106	-.033	.20	7.07	.00	.00	.12	.28	.00	1.89
10.0	10.65	29.431	22.53	.574	6.43	100	-.002	.26	3.14	.00	.00	.08	.44	.07	1.69
15.0	10.46	30.639	23.50	.576	6.45	100	-.002	.36	2.59	.14	.00	.25	.50	.04	1.74
20.0	10.35	31.033	23.83	.581	6.50	101	-.007	.35	2.97	.24	.06	.24	.58	.03	1.76
25.0	10.28	31.367	24.10	.567	6.35	99	.007	.47	4.54	.62	.38	.18	.45	.14	1.61
30.0	10.20	31.643	24.32	.550	6.16	96	.024	.54	6.08	1.80	.32	.15	.46	.16	1.60
35.0	9.83	32.203	24.82	.493	5.52	86	.083	.91	12.95	5.86	.34	.01	.31	.30	1.41
40.0	9.60	32.501	25.09	.487	5.45	84	.091	.96	14.19	6.62	.33	.02	.24	.32	1.34
(0- 21.6M)													9.69	.67MG/M2	

STD PLOT CY378 019

T = Temperature - C
S = Salinity - 0/00
D = Sigma-t
F = S-N or Chlorophyll

Latitude 47-07.7N
Longitude 124-22.5W
Program run: PLCTD, ATLAS, RNDOT

File: MN3019

Date: 1 APR. 1978
Begin: 1530

-----CRUISE CY378

STATION 019-----

DATE 01 APR 78 SECCHI 7.5M WIND SPD 15KT BAROMETER 1003.7MB CLOUD TYPE: CUMULONIMBUS
 TIME 1550(+08) PHOTIC 20.2M DIR 160 AIR DRY C AMOUNT: 100%
 LAT 47-07.7N SUN AM LY WAVE HGT 2M WET C WEATHER: UNBROKEN CLOUD LAYER
 LON 124-22.5W PM LY DIR 280 REL HUMIDITY % VISIBILITY: 10-20KM
 DEPTH 47M TOTAL 178LY PER 6SEC SURF TEMP C TIDE: 1.0M FLOOD

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS ---MICROGRAM---	SIL MICROGRAM	NO3 ATOMS/LITER	NO2 LITER	NH3	CHLA ---MG/M3---	PHAEG	FO/FA
				MGAT/L	ML/L	SAT	AOU								
0.0	10.69	28.566	21.85	.608	6.81	105	-.029	.27	6.33	.01	.02	.42	.44	.02	1.76
1.0	10.69	28.566	21.85	.602	6.74	104	-.023	.25	6.40	.00	.02	.26	.40	.03	1.74
4.0	10.69	28.571	21.86	.599	6.71	104	-.020	.25	5.77	.00	.01	.29	.44	.02	1.77
8.0	10.68	28.784	22.03	.577	6.46	100	-.001	.28	2.76	.00	.00	.55	.62	.01	1.79
13.0	10.44	30.630	23.50	.581	6.50	101	-.007	.33	2.56	.15	.00	.29	.85	.06	1.75
18.0	10.38	30.865	23.69	.578	6.47	101	-.004	.41	3.74	.36	.01	.38	.77	.20	1.64
23.0	10.38	31.122	23.89	.582	6.52	101	-.009	.45	3.34	.33	.01	.39	.58	.13	1.65
28.0	10.32	31.345	24.07	.516	5.77	90	.057	.79	8.20	3.36	.23	.55	.31	.20	1.49
33.0	9.82	32.265	24.87	.486	5.45	84	.090	1.09	14.79	8.63	.20	.44	.20	.39	1.27
38.0	9.36	32.643	25.24	.481	5.39	83	.100	1.15	15.84	9.16	.18	.34	.30	.29	1.41
(0- 20.2M)													13.13	1.39MG/M2	

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-----CRUISE CY378

STATION 020-----

DATE 01 APR 78 SECCHI 7.0M WIND SPD 10KT BARMETER 1005.0MB CLOUD TYPE: STRATOCUMULUS
 TIME 1330(+08) PHOTIC 19.0M DIR 160 AIR DRY C AMOUNT: 90%
 LAT 47-07.0N SUN AM LY WAVE HGT 1M WET C WEATHER: UNBROKEN CLOUD LAYER
 LON 124-18.0W PM LY DIR 270 REL HUMIDITY % VISIBILITY: 10-20KM
 DEPTH 35M TOTAL 178LY PER 6SEC SURF TEMP C TIDE: .6M FLOOD

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----			PHOS	SIL	NO3	NO2	NH3	CHLA	PHAED	FO/FA
				MGAT/L	ML/L	SAT	AOU	---MICROGRAM---	ATOMS/LITER---			---MG/M3---		
1.0		28.441						.17	8.84	.00	.16	.26	.58	.03
3.0		28.443						.19	9.04	.00	.16	.26	.51	.06
5.0		28.448						.22	8.43	.00	.16	.32	.62	.10
9.0		28.468						.29	3.61	.03	.00	.26		
17.0		31.076						.36	2.90	.00	.17	.21	.68	.16
(0- 19.0M)													11.96	2.16MG/M2

				-----SIMULATED IN SITU-----		
C-14 DEPTH M	CHLA ---MG/M3---	PHAED	FO/FA	LIGHT DEPTH %	-CARBON ASSIM- LIGHT DARK MG/M3/(INCUB*)	ASSIM/CHLA MG/MG/(HR OF LIGHT)
1.0	.58	.03		100.	39.37 2.33	5.27
3.0	.51	.06		50.	52.15 1.76	7.95
5.0	.62	.10		25.	54.00 1.41	6.77
9.0				10.	65.37 .76	
17.0	.68	.16		1.	6.60 .55	.75
(0- 19.0M)	11.96	2.16MG/M2			770.26MGC/M2/(INCUB*)	

SAMPLES INCUBATED FROM 1330, 1 APRIL TO 1330, 2 APRIL, INCLUDING
 12.87 HR. OF DAYLIGHT.
 1% LIGHT DEPTH ESTIMATED
 SALINITIES ESTIMATED FROM CTD DOWNCAST
 CHLOROPHYLL AND PHAEOPIGMENT VALUES ABOVE ARE SUMS OF FRACTIONATED
 SAMPLES. ACTUAL MEASURED PIGMENTS ARE SHOWN BELOW:

DEPTH	<20 MICROMETERS			>20 MICROMETERS		
	CHLA	PHAED	FO/FA	CHLA	PHAED	FO/FA
1	.57	.02	1.77	.01	.01	1.33
3	.48	.05	1.73	.03	.01	1.63
5	.58	.06	1.72	.04	.04	1.42
9				.02	.02	1.36
17	.66	.11	1.69	.02	.05	1.20

STD PLOT CY378 020

Latitude 17-07.0N
Longitude 129-18.0W
Program run: PLCTD, ATLAS, NISST

T = Temperature - C
S = Salinity - 0/00
D = Sigma-t
F = S-Y or Chlorophyll
File RN3020

Date 1 APR 1978
Page 1415

-----CRUISE CY378

STATION 020-----

DATE 01 APR 78 SECCHI 7.0M WIND SPD 10KT BARMETER 1005.0MB CLOUD TYPE: STRATOCUMULUS
 TIME 1438(+08) PHOTIC 18.9M DIR 160 AIR DRY C AMOUNT: 90%
 LAT 47-07.0N SUN AM LY WAVE HGT 1M WET C WEATHER: UNBROKEN CLOUD LAYER
 LON 124-18.0W PM LY DIR 270 REL HUMIDITY % VISIBILITY: 10-20KM
 DEPTH 35M TOTAL 178LY PER 6SEC SURF TEMP C TIDE: .6M FLOOD

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS --MICROGRAM--	SIL	NO3 -ATOMS/LITER---	NO2	NH3	CHLA ---MG/M3---	PHAEO	FO/FA
				MGAT/L	ML/L	SAT	AQU								
0.0	10.81	28.441	21.74	.595	6.66	103	-.017	.22	5.87	.01	.02	.26	.51	.03	1.75
3.0	10.81	28.442	21.74	.589	6.60	102	-.011	.18	5.65	.00	.02	.38	.46	.06	1.70
6.0	10.81	28.440	21.74	.590	6.60	102	-.012	.17	5.78	.00	.03	.32	.43	.03	1.75
9.0	10.76	28.869	22.08	.587	6.57	102	-.010	.35	3.36	.00	.03	.18	1.03	.04	1.77
12.0	10.58	30.661	23.50	.595	6.67	104	-.022	.33	2.83	.00	.02	.09	.80	.09	1.72
16.0	10.48	30.974	23.76	.601	6.73	105	-.028	.36	3.02	.00	.03	.07	.77	.13	1.68
21.0	10.43	31.450	24.14	.599	6.71	105	-.027	.33	1.73	.00	.03	.15	.41	.12	1.62
26.0	9.90	32.091	24.72	.482	5.40	84	.094	1.03	14.49	7.94	.07	.03	.44	.36	1.44
(0- 18.9M)													12.80	1.38MG/M2	

STD PLOT
CY378 021

T = Temperature - C
S = Salinity - 0/00
D = Sigma-t
F = S-Y or Chlorophyll

Latitude 97-07.0N
Longitude 124-15.0W
Program run: PLCTD, RTURE, 1021

File: MN3021

Date: 1 APR. 1978
Page: 1025

-----CRUISE CY378

STATION 021-----

DATE 01 APR 78 SECCHI 7.5M WIND SPD 10KT BAROMETER 1005.2MB CLOUD TYPE: STRATOCUMULUS
 TIME 1048(+08) PHOTIC 20.2M DIR 130 AIR DRY 8.9C AMOUNT: 90%
 LAT 47-07.0N SUN AM LY WAVE HGT 2M WET 8.8C WEATHER: UNBROKEN CLOUD LAYER
 LON 124-15.0W PM LY DIR 280 REL HUMIDITY 99% VISIBILITY: 10-20KM
 DEPTH 24M TOTAL 178LY PER 6SEC SURF TEMP C TIDE: .9M EBB

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS	SIL	NO3	NO2	NH3	CHLA	PHAED	FD/FA
				MGAT/L	ML/L	SAT	AOU	---MICROGRAM---	---ATOMS/LITER---				---MG/M3---		
0.0	10.41	28.148	21.58	.609	6.82	104	-.025	.21	8.25	.00	.16	.21	.92	.02	1.78
2.0	10.41	28.157	21.58	.595	6.66	102	-.011	.19	7.86	.03	.00	.16	.87	.07	1.74
4.0	10.40	28.237	21.65	.621	6.95	106	-.037	.18	7.93	.03	.00	.17	1.03	.00	1.80
6.0	10.39	28.543	21.89	.601	6.73	103	-.018	.35	6.17	.03	.00	.35	2.41	.03	1.79
8.0	10.50	29.352	22.50	.606	6.78	105	-.028	.32	3.80	.03	.00	.24	1.08	.15	1.70
12.0	10.59	30.810	23.61	.587	6.57	103	-.015	.41	3.46	.05	.13	.18	1.90	.03	1.79
14.0	10.44	30.999	23.78	.553	6.19	96	.002	.53	4.78	.79	.29	.31	2.57	.13	1.76
17.0	10.25	31.363	24.10	.489	5.47	85	.085	.90	10.96	4.61	.22	.28	1.59	.42	1.63
20.0	9.91	32.209	24.81	.457	5.12	79	.118	1.20	17.63	8.43	.28	.39	.77	1.16	1.32
(0- 20.2M)													34.46	3.96MG/M2	

STD PLOT
CY378 022

T = Temperature - C
S = Salinity - g/kg
D = Sigma-t
F = S-V or Chlorophyll

File MN3022

Date 1 APR. 1978
Begin 804

Latitude 47-07.0N
Longitude 124-14.0W
Program run: PLOT, ATLAS, HMDT

-----CRUISE CY378 STATION 022-----

DATE 01 APR 78 SECCHI 3.0M WIND SPD 10KT BAROMETER 1005.0MB CLOUD TYPE: CUMULUS
 TIME 1008(+08) PHOTIC 8.1M DIR 130 AIR DRY C AMOUNT: 70%
 LAT 47-07.0N SUN AM LY WAVE HGT 2M WET C WEATHER: PARTLY CLOUDY
 LON 124-14.0W PM LY DIR 280 REL HUMIDITY % VISIBILITY: 10-20KM
 DEPTH 14M TOTAL 178LY PER 6SEC SURF TEMP C TIDE: 1.2M EBB

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS	SIL	NO3	NO2	NH3	CHLA	PHAED	FO/FA
				MGAT/L	ML/L	SAT	AOU	--MICROGRAM-ATOMS/LITER--					---MG/M3---		
0.0	10.25	29.149	22.38	.602	6.74	103	-.002	.34	7.23	.00	.16	.19	1.15	.05	1.76
2.0	10.24	29.146	22.38	.594	6.66	102	-.012	.37	5.38	.00	.15	.21	5.62	.29	1.76
4.0	10.25	29.194	22.41	.585	6.55	101	-.003	.27	8.05	.00	.17	.00	7.23	.00	1.83
6.0	10.36	29.844	22.90	.571	6.39	99	.007	.40	2.63	.00	.17	.39	8.68	.06	1.79
8.0	10.39	30.777	23.62	.556	6.22	97	.019	.48	4.08	.24	.17	.37	7.39	.06	1.79
(0- 8.1M)													52.34	.82MG/M2	

STD PLOT
CY678 CTD

T = Temperature - C
S = Salinity - 0/00
D = Sigma-t
F = S-V or Chlorophyll

Latitude 47-07.0N
Longitude 125-45.0W
Program run: NRGCTD, NRGCT

File NRGCTD

Date 9 JUNE 1978
Begin 1845

-----CRUISE CY678 STATION 007-----

DATE 10 JUN 78 SECCHI 22.0M WIND SPD OKT BAROMETER 1013.0MB CLOUD TYPE: STRATOCUMULUS
 TIME 0730(+07) PHOTIC 59.4M DIR AIR DRY C AMOUNT: 100%
 LAT 47-07.0N SUN AM LY WAVE HGT 2M WET C WEATHER: UNBROKEN CLOUD LAYER
 LON 125-45.0W PM LY DIR 270 REL HUMIDITY % VISIBILITY: 20-50KM
 DEPTH M TOTAL 444LY PER SEC SURF TEMP C TIDE: M

NO STANDARD BOTTLE CAST WAS DONE AT THIS STATION.

THIS WAS A CTD CALIBRATION CAST WITH RESULTS AS FOLLOW:

DEPTH		TEMPERATURE		SALINITY	
BOTTLE	CTD	BOTTLE	CTD	BOTTLE	CTD
0	0	14.03	13.98	31.929	31.943
294	295	6.11	6.09	33.947	33.957
592	593	4.33	4.34	34.146	34.156
870	880	3.67	3.64	34.345	34.351
1171	1181	3.10	3.07	34.453	34.460
1465	1476	2.57	2.55	34.518	34.527

STD PLOT
CY678 007

T = Temperature - C
S = Salinity - 0/00
D = Sigma-t
F = S-V or Chlorophyll

Latitude 47-07.0N
Longitude 125-45.0W
Program run: NECTO, SPHIT, REMOT

File: NN6007

Date 10 JUNE 1976
Begin 090

-----CRUISE CY678

STATION 007-----

DATE 10 JUN 78 SECCHI 22.0M WIND SPD OKT BAROMETER 1013.0MB CLOUD TYPE: STRATOCUMULUS
 TIME 0907(+07) PHOTIC 59.4M DIR AIR DRY C AMOUNT: 100%
 LAT 47-07.0N SUN AM LY WAVE HGT 2M WET C WEATHER: UNBROKEN CLOUD LAYER
 LON 125-45.0W PM LY DIR 270 REL HUMIDITY % VISIBILITY: 20-50KM
 DEPTH M TOTAL 444LY PER SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL 0/00	SIG-T	-----OXYGEN-----				PHOS	SIL	NO3	NO2	NH3	CHLA	PHAEO	FO/FA
				MGAT/L	ML/L	SAT	ADU	---MICROGRAM---	---ATOMS/LITER---				---MG/M3---		
1.0	14.08	31.948	23.84	.620	6.94	118	-.093	.35	3.66	.00	.00	.08	.11	.00	1.83
7.0	14.06	31.946	23.84	.599	6.70	114	-.072	.41	3.66	.00	.00	.10	.11	.00	1.86
14.0	14.06	31.946	23.84	.606	6.79	115	-.079	.34	3.66	.00	.00	.07	.11	.00	1.83
21.0	13.54	32.002	23.99	.624	6.99	117	-.091	.34	3.66	.00	.00	.07	.10	.00	1.89
31.0	10.77	32.344	24.77	.660	7.39	117	-.096	.40	4.34	.00	.00	.07	.16	.00	1.83
40.0	9.67	32.468	25.05	.642	7.19	111	-.065	.61	6.08	2.16	.00	.06	.35	.03	1.74
51.0	9.37	32.536	25.14	.598	6.70	103	-.017	.80	6.15	4.89	.03	.06	.25	.02	1.74
74.0	8.82	32.678	25.35	.544	6.09	93	.044	1.19	10.49	9.66	.03	.06	.11	.01	1.76
101.0	8.28	32.990	25.68	.485	5.43	82	.109	1.47	18.34	16.42	.02	.05	.03	.01	1.60
147.0	7.57	33.567	26.23	.383	4.29	64	.218	1.83	31.11	25.29	.11	.05	.01	.01	1.33
(0- 59.4M)													11.06		.56MG/M2

STD PLOT
CY678 008

T = Temperature - C
S = Salinity - 0/00
D = Sigma-t
F = C-Y or Chlorophyll

Latitude 47-07.0N
Longitude 125-36.1W
Program run: NHC7D, NHC7T

File: MNS008

Date: 10 JUNE 1978
Depth: 1090

-----CRUISE CY678

STATION 008-----

DATE 10 JUN 78 SECCHI 28.0M WIND SPD 5KT BAROMETER 1014.5MB CLOUD TYPE: STRATOCUMULUS
 TIME 1055(+07) PHOTIC 75.6M DIR 180 AIR DRY C AMOUNT: 100%
 LAT 47-07.0N SUN AM LY WAVE HGT 2M WET C WEATHER: UNBROKEN CLOUD LAYER
 LON 125-38.1W PM LY DIR 270 REL HUMIDITY % VISIBILITY: 20-50KM
 DEPTH M TOTAL 444LY PER SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS --MICROGRAM--	SIL	NO3 -ATOMS/LITER--	NO2	NH3	CHLA ---MG/M3---	PHAEO	FO/FA
				MGAT/L	ML/L	SAT	AQU								
1.0	14.25	31.947	23.80	.605	6.77	115	-.080	.39	3.98	.00	.04	.12	.09	.00	1.82
7.0	14.14	31.947	23.82	.608	6.81	115	-.082	.34	3.98	.00	.04	.10	.12	.00	1.90
14.0	14.10	31.958	23.84	.595	6.66	113	-.068	.37	3.98	.00	.04	.13	.09	.00	1.89
19.0	13.82	31.989	23.92	.592	6.63	112	-.062	.37	3.98	.00	.04	.09	.12	.00	1.81
30.0	10.29	32.354	24.86	.675	7.55	118	-.105	.52	7.49	.88	.03	.09	.27	.00	1.86
38.0	10.12	32.452	24.97	.579	6.49	101	-.007	.55	6.55	1.29	.03	.10	.25	.00	1.82
49.0	9.64	32.511	25.09	.607	6.80	105	-.029	.69	6.48	3.12	.03	.10	.20	.00	1.82
71.0	9.07	32.610	25.26	.621	6.95	106	-.036	.82	6.76	5.99	.15	.08	.26	.00	1.83
97.0	8.26	32.948	25.65	.547	6.12	92	.047	1.35	19.17	16.27	.12	.07	.04	.01	1.60
149.0	7.56	33.631	26.28	.375	4.20	62	.226	1.88	33.13	26.19	.08	.01	.00	.02	1.09
(0- 75.6M)													14.86	.01MG/M2	

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-----CRUISE CY678 STATION 008-----

DATE 10 JUN 78 SECCHI 28.0M WIND SPD 5KT BARMETER 1014.5MB CLOUD TYPE: STRATOCUMULUS
 TIME 1200(+07) PHOTIC 76.0M DIR 180 AIR DRY C AMOUNT: 100%
 LAT 47-07.0N SUN AM LY WAVE HGT 2M WET C WEATHER: UNBROKEN CLOUD LAYER
 LON 125-38.0W PM LY DIR 270 REL HUMIDITY % VISIBILITY: 20-50KM
 DEPTH M TOTAL 444LY PER SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS	SIL	NO3	NO2	NH3	CHLA	PHAEO	FD/FA
				MGAT/L	ML/L	SAT	AQU	---MICROGRAM---	---ATOMS/LITER---				---MG/M3---		
1.0		31.980						.35	3.66	.00	.00	.02	.11	.00	1.90
11.0		31.888						.34	3.67	.00	.10	.00	.14	.00	1.80
23.0		31.940						.35	3.67	.00	.11	.00	.12	.00	1.88
38.0		32.438						.51	6.45	1.26	.20	.00	.27	.00	1.86
76.0		32.633						.83	7.17	6.19	.25	.02	.16	.01	1.73
(0-76.0M)													14.02	.19	MG/M2

				-----SIMULATED IN SITU-----			
C-14 DEPTH M	CHLA ---MG/M3---	PHAEO	FD/FA	LIGHT DEPTH %	-CARBON ASSIM- LIGHT DARK MG/M3/(INCUB*)	ASSIM/CHLA MG/MG/(HR OF LIGHT)	
1.0	.11	.00	1.90	100.	18.13	.65	11.35
11.0	.14	.00	1.80	50.	24.98	.84	12.29
23.0	.12	.00	1.88	25.	18.48	.46	10.61
38.0	.27	.00	1.86	10.	33.11	.50	8.45
76.0	.16	.01	1.73	1.	1.31	.21	.56
(0-76.0M)	14.02	.19	MG/M2		1535.35	MG/M2/(INCUB*)	

SAMPLES INCUBATED FROM 1430, 10 JUNE TO 1400, 11 JUNE, INCLUDING
 14.52 HR. OF DAYLIGHT.
 SALINITIES DETERMINED FROM WATER BOTTLE SAMPLES.

STD PLOT
CY678 009

T = Temperature - C
S = Salinity - ‰
D = Sigma-t
F = S-V or Chlorophyll

Latitude 47-07.0N
Longitude 125-30.0W
Program run: NSCTD, NSCT

File: HN6009

Date: 10 JUNE 1978
Page: 1400

-----CRUISE CY678

STATION 009-----

DATE 10 JUN 78	SECCHI 21.0M	WIND SPD	KT	BAROMETER	MB CLOUD TYPE:
TIME 1420(+07)	PHOTIC 56.7M	DIR		AIR DRY	C AMOUNT: %
LAT 47-07.0N	SUN AM	WAVE HGT	M	WET	C WEATHER:
LON 125-30.9W	PM	DIR		REL HUMIDITY	% VISIBILITY:
DEPTH M	TOTAL 444LY	PER	SEC	SURF TEMP	C TIDE: M

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS	SIL	NO3	NO2	NH3	CHLA	PHAEO	FO/FA
				MGAT/L	ML/L	SAT	AOU	--MICROGRAM--	ATOMS/LITER--				---MG/M3---		
1.0	14.38	32.058	23.86	.567	6.35	108	-.043	.35	4.00	.00	.08	.00			
7.0	14.11	32.045	23.91	.558	6.25	106	-.032	.37	4.00	.00	.08	.00	.07	.00	1.87
13.0	14.06	32.048	23.92	.564	6.32	107	-.037	.34	4.00	.00	.08	.00	.11	.00	1.83
19.0	11.79	32.272	24.53	.621	6.96	113	-.069	.38	5.10	.00	.08	.00	.19	.00	1.87
29.0	10.54	32.399	24.85	.623	6.98	110	-.056	.41	5.73	.00	.08	.01	.22	.00	1.86
40.0	9.92	32.480	25.02	.607	6.79	106	-.033	.53	6.43	1.77	.08	.00	.29	.00	1.87
50.0	9.57	32.540	25.12	.626	7.01	108	-.048	.66	6.43	3.02	.09	.01	.20	.01	1.78
73.0	8.91	32.622	25.29	.614	6.87	105	-.027	.88	8.09	6.53	.22	.01	.24	.01	1.76
97.0	8.31	32.892	25.60	.519	5.81	87	.075	1.26	16.60	14.37	.08	.00	.05	.01	1.68
147.0	7.50	33.627	26.29	.371	4.15	62	.231	1.83	33.16	25.82	.08	.00	.01	.02	1.20
(0- 56.7M)													10.61	.12MG/M2	

STD PLOT
CY678 010

T = Temperature - C
S = Salinity - ‰
D = Sigma-t
F = G-V or Chlorophyll

Latitude 47-07.0N
Longitude 125-23.5W
Program run: NECTD, REBOT

File: MNS010

Date: 10 JUNE 1978
Begin: 1800

-----CRUISE CY678

STATION 010-----

DATE 10 JUN 78 SECCHI 21.0M WIND SPD KT BARMETER MB CLOUD TYPE:
 TIME 1710(+07) PHOTIC 56.7M DIR AIR DRY C AMOUNT: %
 LAT 47-07.0N SUN AM LY WAVE HGT M WET C WEATHER:
 LON 125-23.5W PM LY DIR REL HUMIDITY % VISIBILITY:
 DEPTH M TOTAL 444LY PER SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL 0/00	SIG-T	-----OXYGEN-----				PHOS --MICROGRAM--	SIL --ATOMS/LITER--	NO3 --	NO2 --	NH3 --	CHLA --MG/M3--	PHAED --	FO/FA	
				MGAT/L	ML/L	SAT	AOU									
2.0	14.41	32.083	23.87	.557	6.23	106	-.034	.33	3.77	.00	.03	.01	.10	.00	1.90	
7.0	14.38	32.085	23.88	.555	6.21	106	-.032	.32	3.77	.00	.02	.01	.10	.00	1.86	
13.0	14.22	32.093	23.92	.561	6.29	107	-.036	.34	3.77	.00	.01	.01	.11	.00	1.86	
19.0	12.51	32.195	24.34	.591	6.62	109	-.047	.39	4.31	.00	.02	.00	.13	.00	1.85	
28.0	10.70	32.427	24.85	.623	6.98	110	-.058	.54	5.00	.00	.02	.11	.19	.00	1.84	
39.0	10.04	32.499	25.02	.615	6.89	107	-.042	.52	5.35	.99	.02	.07	.25	.00	1.82	
50.0	9.59	32.527	25.11	.594	6.66	103	-.016	.66	6.05	3.31	.02	.02	.28	.01	1.76	
73.0	8.76	32.651	25.34	.538	6.02	91	.051	1.02	10.61	9.42	.03	.06	.14	.01	1.76	
98.0	7.74	33.054	25.81	.501	5.61	83	.100	1.15	16.16	13.91	.03	.00	.05	.01	1.70	
148.0	7.53	33.637	26.29	.422	4.73	70	.179	1.84	33.82	26.09	.00	.00	.01	.00	2.00	
(0- 56.7M)															10.56	.12MG/M2

STD PLOT
CY678 011

T = Temperature - C
S = Salinity - 0/00
D = Sigma-t
F = S-V or Chlorophyll
File MNG011

Lat/Long 47-07.0N
Long/Time 125-16.3W
Program run: MNCED. MNCED

Date 10 JUNE 1976
Begin 1830

-----CRUISE CY678

STATION 011-----

DATE 10 JUN 78 SECCHI 19.0M WIND SPD 10KT BAROMETER 1015.5MB CLOUD TYPE: STRATOCUMULUS
 TIME 1910(+07) PHOTIC 51.3M DIR 180 AIR DRY 12.3C AMOUNT: 90%
 LAT 47-07.0N SUN AM LY WAVE HGT 2M WET 11.1C WEATHER: UNBROKEN CLOUD LAYER
 LON 125-16.3W PM LY DIR 270 REL HUMIDITY 82% VISIBILITY: 20-50KM
 DEPTH M TOTAL 444LY PER 6SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS	SIL	NO3	NO2	NH3	CHLA	PHAEO	FD/FA	
				MGAT/L	ML/L	SAT	AQU	---MICROGRAM-ATOMS/LITER---							---MG/M3---	
1.0	14.18	31.900	23.78	.603	6.75	115	-.077	.26	1.80	.00	.01	.04	.08	.00	1.93	
10.0	14.17	31.917	23.79	.611	6.84	116	-.085	.30	1.93	.00	.01	.00	.05	.00	2.29	
19.0	11.73	31.972	24.31	.624	6.99	113	-.070	.31	2.33	.00	.01	.00	.09	.00	1.88	
30.0	10.57	32.299	24.77	.631	7.07	111	-.064	.40	4.90	.00	.00	.00	.11	.00	1.78	
30.0	10.57	32.299	24.77	.631	7.07	111	-.064	.44	5.04	.00	.00	.02	.22	.00	1.79	
40.0	9.65	32.536	25.11	.618	6.92	107	-.041	.62	5.87	2.47	.02	.02	.28	.00	1.89	
50.0	9.16	32.578	25.22	.610	6.84	105	-.026	.72	7.15	4.71	.04	.09	.19	.00	1.79	
72.0	8.70	32.686	25.38	.573	6.41	97	.016	.88	9.43	7.74	.25	.17	.13	.02	1.69	
97.0	8.06	33.077	25.78	.440	4.93	74	.156	1.37	22.62	18.45	.15	.21	.02	.01	1.50	
146.0	7.48	33.691	26.34	.324	3.63	54	.278	1.96	36.43	27.52	.11	.55	.01	.00	1.50	
(0- 51.3M)													7.52	.00MG/M2		

STD PLOT
CY678 012

T = Temperature - C
S = Salinity - ‰
D = Sigma-t
F = C-Y or Chlorophyll

Latitude 97-07.0N
Longitude 125-08.0E
Program run: RBCD, RBCF

File: HNSD12

Date: 10 JUNE 1978
Depth: 2010

-----CRUISE CY678

STATION 012-----

DATE 10 JUN 78 SECCHI 19.0M WIND SPD 14KT BARDMETER 1015.3MB CLOUD TYPE: STRATOCUMULUS
 TIME 2045(+07) PHOTIC 51.3M DIR 170 AIR DRY C AMOUNT: 100%
 LAT 47-07.0N SUN AM LY WAVE HGT 2M WET C WEATHER: UNBROKEN CLOUD LAYER
 LON 125-09.0W PM LY DIR 250 REL HUMIDITY % VISIBILITY: 20-50KM
 DEPTH M TOTAL 444LY PER SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS --MICROGRAM--	SIL --ATOMS/LITER--	NO3 --	NO2 --	NH3 --	CHLA --MG/M3--	PHAED --	FD/FA
				MGAT/L	ML/L	SAT	ADU								
1.0	14.34	31.804	23.67	.587	6.58	112	-.062	.28	1.39	.00	.07	.22	.09	.00	1.84
7.0	14.32	31.802	23.67	.572	6.40	109	-.047	.29	1.45	.00	.07	.37	.10	.00	1.88
14.0	13.87	31.831	23.79	.655	7.34	124	-.125	.26	1.58	.00	.07	.00	.10	.00	1.85
19.0	12.06	31.968	24.25	.616	6.90	112	-.066	.35	2.10	.00	.04	.00	.12	.00	1.84
30.0	9.99	32.311	24.88	.630	7.05	110	-.056	.63	5.71	.00	.00	.00	.35	.00	1.81
40.0	9.60	32.490	25.08	.624	6.99	108	-.046	.56	6.49	1.39	.00	.00	.27	.10	1.78
49.0	9.22	32.518	25.16	.612	6.85	105	-.029	.77	7.86	4.95	.00	.00	.26	.00	1.81
73.0	8.37	32.679	25.42	.538	6.03	91	.056	1.08	13.70	11.13	.00	.05	.08	.00	1.78
99.0	7.51	33.239	25.98	.445	4.98	74	.158	1.53	25.21	20.04	.00	.05	.01	.01	1.33
147.0	7.33	33.774	26.43	.309	3.47	51	.295	2.03	39.75	28.81	.00	.02	.01	.01	1.25
(0- 51.3M)													10.56	.95MG/M2	

STD PLOT
CY678 013

T = Temperature - C
S = Salinity - ‰
D = Sigma-t
F = S-V or Chlorophyll

Latitude 47-07.0N
Longitude 125-01.7W
Program run: NSCTD, RNDOT

File: HN6013

Date: 10 JUNE 1978
Page: 2145

-----CRUISE CY678

STATION 013-----

DATE 10 JUN 78 SECCHI M WIND SPD 18KT BAROMETER 1015.8MB CLOUD TYPE: NIMBOSTRATUS
 TIME 2220(+07) PHOTIC M AIR DRY C AMOUNT: 100%
 LAT 47-07.0N SUN AM LY WAVE HGT 2M WET C WEATHER: UNBROKEN CLOUD LAYER
 LON 125-01.7W PM LY DIR 250 REL HUMIDITY % VISIBILITY: 4-10KM
 DEPTH M TOTAL 444LY PER SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS --MICROGRAM--	SIL	NO3 --ATOMS/LITER--	NO2	NH3	CHLA ---MG/M3---	PHAEO	FO/FA
				MGAT/L	ML/L	SAT	AOU								
1.0	14.21	31.827	23.72	.588	6.58	112	-.062	.32	1.65	.00	.04	.06	.06	.00	1.85
7.0	14.21	31.837	23.72	.586	6.57	111	-.060	.31	1.65	.00	.00	.05	.11	.00	1.80
14.0	13.40	31.876	23.92	.604	6.76	113	-.069	.31	1.92	.00	.00	.04	.11	.00	
19.0	12.00	31.979	24.27	.626	7.01	114	-.074	.39	1.99	.00	.00	.02	.14	.00	1.86
31.0	9.96	32.214	24.81	.626	7.01	108	-.048	.46	4.80	.02	.00	.11	.12	.06	1.54
40.0	9.27	32.517	25.15	.591	6.62	101	-.009	.72	6.94	4.52	.00	.00	.25	.02	1.74
49.0	8.89	32.550	25.24	.585	6.55	100	.002	.85	8.44	6.80	.04	.00	.23	.01	1.76
73.0	8.22	32.809	25.54	.513	5.75	86	.082	1.22	15.39	13.63	.02	.00	.07	.00	1.76
99.0	7.66	33.295	26.01	.437	4.90	73	.164	1.57	24.11	24.88	.00	.00	.01	.01	1.50
149.0	6.98	33.783	26.48	.289	3.24	47	.320	2.11	40.48	29.63	.00	.00	.01	.03	1.14

STD PLOT
CY678 014

T = Temperature - C
S = Salinity - ‰/1000
D = Sigma-t

F = S-V or Chlorophyll

File: HNG014

Date: 11 JUNE 1978
Begin: 425

Latitude: 47-07.0N
Longitude: 124-56.4W
Program run: HECTIL HNG01

-----CRUISE CY678

STATION 014-----

DATE 11 JUN 78 SECCHI M WIND SPD 11KT BAROMETER 1015.0MB CLOUD TYPE: STRATOCUMULUS
 TIME 0447(+07) PHOTIC M DIR 170 AIR DRY C AMOUNT: 90%
 LAT 47-07.0N SUN AM LY WAVE HGT 2M WET C WEATHER: UNBROKEN CLOUD LAYER
 LON 124-54.4W PM LY DIR 270 REL HUMIDITY % VISIBILITY: 20-50KM
 DEPTH 154M TOTAL 398LY PER 8SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS	SIL	NO3	NO2	NH3	CHLA	PHAEO	FO/FA
				MGAT/L	ML/L	SAT	AQU	---MICROGRAM---	---ATOMS/LITER---				---MG/M3---		
2.0	13.77	31.925	23.88					.29	2.04	.00	.01	.00	.13	.00	1.82
6.0	13.73	31.943	23.90	.598	6.69	113	-.067	.33	2.05	.00	.01	.00	.13	.00	1.89
15.0	12.80	31.999	24.13	.595	6.66	110	-.054	.33	2.45	.00	.00	.00	.14	.00	1.86
21.0	12.29	32.032	24.25	.595	6.66	109	-.048	.33	2.46	.00	.01	.45	.16	.00	1.86
30.0	10.85	32.197	24.64	.629	7.04	112	-.065	.36	3.75	.00	.00	.52	.18	.00	1.83
39.0	9.33	32.453	25.10	.620	6.94	107	-.038	.67	7.22	3.00	.04	.44	.29	.03	1.72
51.0	8.92	32.522	25.21	.602	6.75	103	-.015	.87	8.47	5.95	.11	.43	.26	.03	1.73
75.0	8.15	32.869	25.60	.561	6.28	94	.035	1.24	20.45	13.98	.11	.39	.07	.01	1.72
102.0	7.62	33.349	26.05	.418	4.68	70	.183	1.73	27.18	22.61	.08	.34	.01	.03	1.19
148.0	6.61	33.896	26.62	.197	2.21	32	.416	2.59	54.88	33.48	.43	.39	.03	.18	1.10

STD PLOT
CY678 015

T = Temperature - C
S = Salinity - ‰
D = Sigma-t
F = F or Chlorophyll

Latitude 47-07.0N
Longitude 124-47.5W
Program run: NCTD, NCTD

File: IN6015

Date: 11 JUNE 1978
Begin: 000

-----CRUISE CY678

STATION 015-----

DATE 11 JUN 78 SECCHI M WIND SPD 10KT BARMETER 1016.0MB CLOUD TYPE: STRATOCUMULUS
 TIME 0630(+07) PHOTIC M DIR 180 AIR DRY C AMOUNT: 90%
 LAT 47-07.0N SUN AM LY WAVE HGT 2M WET C WEATHER: UNBROKEN CLOUD LAYER
 LGN 124-47.3W PM LY DIR 270 REL HUMIDITY % VISIBILITY: 20-50KM
 DEPTH 130M TOTAL 393LY PER 8SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL 0/00	SIG-T	-----OXYGEN-----			AOU	PHOS --MICROGRAM--	SIL	NO3 --ATOMS/LITER--	NO2	NH3	CHLA ---MG/M3---	PHAED	FD/FA
				MGAT/L	ML/L	SAT									
1.0	13.62	31.794	23.81	.588	6.59	110	-.055	.26	1.43	.02	.01	.34	.09	.00	1.79
6.0	13.63	31.831	23.84					.27	1.57	.02	.01	.28	.04	.00	2.00
14.0	13.59	31.915	23.91	.575	6.44	108	-.042	.28	2.11	.08	.00	.16	.19	.00	1.89
19.0	13.53	31.968	23.96												
30.0	10.99	32.184	24.61	.627	7.02	112	-.065	.78	3.86	.01	.01	.32	.23	.00	1.85
42.0	9.14	32.447	25.12	.598	6.70	102	-.014	.74	8.44	5.10	.07	.07	.50	.03	1.76
51.0	8.65	32.565	25.29	.567	6.35	96	.023	.95	10.34	8.84	.00	.04	.31	.03	1.73
74.0	8.03	32.939	25.67	.488	5.46	82	.109	1.39	19.96	16.58	.00	.03	.08	.03	1.58
103.0	7.48	33.463	26.16	.408	4.57	68	.195	1.76	29.67	24.10	.00	.01	.01	.03	1.13
128.0	6.86	33.832	26.54												

STD PLOT
CY678 016

Latitude 97-07.0N
Longitude 124-40.0W
Program run: HSCD, HSCOT

T = Temperature - C
S = Salinity - ‰
D = Sigma-t
F = S-V or Chlorophyll
File HNS016

Date 11 JUNE 1978
Depth 300

-----CRUISE CY678

STATION 016-----

DATE 11 JUN 78 SECCHI 12.0M WIND SPD 14KT BAROMETER 1016.5MB CLOUD TYPE: CUMULUS
 TIME 0825(+07) PHOTIC 32.4M DIR 170 AIR DRY C AMOUNT: 70%
 LAT 47-07.0N SUN AM LY WAVE HGT 2M WET C WEATHER: PARTLY CLOUDY
 LON 124-40.0W PM LY DIR 240 REL HUMIDITY % VISIBILITY: 20-50KM
 DEPTH 97M TOTAL 398LY PER SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS --MICROGRAM--	SIL	NO3 --ATOMS/LITER---	NO2	NH3	CHLA ---MG/M3---	PHAEO	FO/FA
				MGAT/L	ML/L	SAT	AOU								
2.0	13.68	31.888	23.87	.598	6.69	112	-.066	.28	1.50	.01	.00	.05	.23	.00	1.87
5.0	13.71	31.863	23.85	.642	7.19	121	-.111	.26	1.43	.01	.00	.03	.26	.00	1.92
10.0	13.65	31.898	23.89	.616	6.90	116	-.084	.28	1.57	.01	.00	.08	.24	.00	1.86
14.0	13.44	31.931	23.95	.598	6.70	112	-.064	.31	1.57	.01	.00	.06	.15	.00	1.81
21.0	10.87	32.093	24.56	.601	6.73	107	-.037	.38	2.56	.12	.00	.05	.60	.02	1.77
25.0	9.87	32.097	24.73	.573	6.42	99	.003	.67	8.93	4.02	.00	.03	.77	.05	1.75
29.0	9.38	32.223	24.91	.538	6.02	92	.044	.97	15.26	9.51	.00	.02	.58	.00	1.80
38.0	8.72	32.513	25.24	.514	5.76	87	.076	1.14	17.22	12.01	.00	.01	.22	.02	1.74
51.0	8.19	32.830	25.56	.477	5.34	80	.119	1.37	21.61	16.44	.00	.00	.11	.07	1.50
76.0	7.31	33.540	26.25	.330	3.70	55	.275	2.00	38.51	27.30	.00	.00	.03	.11	1.18
(0- 32.4M)														13.03	.32MG/M2

STD PLOT
CY678 017

T = Temperature - C
S = Salinity - ‰/00
D = Sigma-t
F = S-V or Chlorophyll

Latitude 47-07.0N
Longitude 124-32.5W
Program run: NECTD, NECT

File: MING017

Date: 11 JUNE 1978
Depth: 300

-----CRUISE CY678

STATION 017-----

DATE 11 JUN 78 SECCHI 14.0M WIND SPD 20KT BAROMETER 1017.0MB CLOUD TYPE: STRATOCUMULUS
 TIME 0940(+07) PHOTIC 37.8M DIR 170 AIR DRY C AMOUNT: 100%
 LAT 47-07.0N SUN AM LY WAVE HGT 2M WET C WEATHER: UNBROKEN CLOUD LAYER
 LON 124-32.5W PM LY DIR 240 REL HUMIDITY % VISIBILITY: 10-20KM
 DEPTH 70M TOTAL 398LY PER SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS	SIL	NO3	NO2	NH3	CHLA	PHAEO	FO/FA
				MGAT/L	ML/L	SAT	AQU	---MICROGRAM---	---ATOMS/LITER---				---MG/M3---		
1.0	14.10	31.481	23.47	.664	7.43	126	-.136	.20	.60	.04	.00	.00	.65	.10	1.70
5.0	14.11	31.480	23.47	.625	7.00	118	-.097	.21	.48	.03	.00	.00	.46	.05	1.72
10.0	14.10	31.480	23.47	.628	7.03	119	-.100	.17	.48	.03	.00	.00	.39	.00	1.85
13.0	13.83	31.467	23.52	.618	6.93	116	-.087	.17	.48	.00	.00	.00	.39	.00	1.85
20.0	10.74	31.924	24.45	.735	8.24	130	-.169	.19	.35	.00	.00	.00	1.59	.13	1.74
24.0	9.96	32.136	24.75	.578	6.47	101	-.003	.62	1.26	.10	.00	.04	4.98	1.96	1.57
30.0	8.91	32.492	25.19	.391	4.38	67	.196	1.53	21.74	13.76	.00	1.66	4.18	1.74	1.57
40.0	8.00	33.063	25.78	.373	4.18	62	.224	1.94	36.30	24.97	.01	.22	.87	1.39	1.31
49.0	7.57	33.419	26.12	.342	3.83	57	.260	1.98	39.67	26.43	.00	.16	.16	.39	1.23
58.0	7.14	33.721	26.41	.245	2.74	40	.362	2.38	50.84	30.39	.01	.40	.09	.39	1.15
(0- 37.8M)													76.25	28.77MG/M2	

STD PLOT
CY678 018

T = Temperature - C
S = Salinity - 0/00
D = Sigma-t
F = S-V or Chlorophyll

Latitude 47-07.0N
Longitude 124-26.0W
Program run: NECTD, R0001

File: HN6018

Date: 11 JUNE 1978
Depth: 1090

-----CRUISE CY678

STATION 018-----

DATE 11 JUN 78 SECCHI 8.0M WIND SPD 14KT BAROMETER 1017.8MB CLOUD TYPE: STRATOCUMULUS
 TIME 1100(+07) PHOTIC 21.6M DIR 160 AIR DRY C AMOUNT: 100%
 LAT 47-07.0N SUN AM LY WAVE HGT 2M WET C WEATHER: UNBROKEN CLOUD LAYER
 LON 124-26.6W PM LY DIR 240 REL HUMIDITY % VISIBILITY: 10-20KM
 DEPTH 55M TOTAL 398LY PER SEC SURF TEMP C TIDE: .1M LOW SLACK

DEPTH M	TEMP C	SAL 0/00	SIG-T	-----OXYGEN-----				PHOS --MICROGRAM--	SIL	NO3 --ATOMS/LITER--	NO2	NH3	CHLA ---MG/M3---	PHAED	FO/FA
				MGAT/L	ML/L	SAT	AOU								
1.0	15.25	30.285	22.31	.628	7.03	121	-.108	.11	.62	.02	.00	.00	.46	.08	1.68
5.0	15.23	30.294	22.33	.633	7.09	122	-.113	.08	.56	.02	.00	.00	.53	.01	1.79
10.0	12.62	31.110	23.48	.695	7.78	127	-.149	.14	.50	.02	.00	.01	.64	.01	1.78
16.0	10.04	31.942	24.58	.562	6.30	98	.013	.59	2.13	.24	.00	.06	2.65	.00	1.83
19.0	9.57	32.156	24.83	.517	5.80	89	.063	1.13	6.19	5.98	.03	1.05	2.73	.35	1.71
25.0	8.47	32.700	25.42	.443	4.96	75	.149	1.72	30.56	19.77	.13	1.05	.54	1.43	1.22
30.0	7.96	33.050	25.77	.368	4.12	62	.230	1.85	35.71	24.32	.13	.12	.31	.80	1.22
34.0	7.74	33.238	25.95	.377	4.22	63	.223	1.76	32.80	23.55	.11	.15	.19	.44	1.24
40.0	7.46	33.474	26.18	.336	3.76	56	.267	1.93	37.17	26.32	.09	.03	.16	.39	1.23
49.0	7.34	33.615	26.30	.255	2.86	42	.349	2.30	49.93	29.53	.08	.27	.15	.58	1.17
(0- 21.6M)													29.17	2.38MG/M2	

STD PLOT
CY678 019

T = Temperature - C
S = Salinity - 0/00
σ = Sigma-t
F = S-V or Chlorophyll

Lat/Long: 47-07.08
Longitude: 124-22.38
Program run: NECTS, PLOT

File: NNS019

Date: 11 JUNE 1976
Page: 1510

-----CRUISE CY678

STATION 019-----

DATE 11 JUN 78 SECCHI 10.0M WIND SPD 13KT BAROMETER 1018.2MB CLOUD TYPE:
 TIME 1530(+07) PHOTIC 27.0M DIR 170 AIR DRY C AMOUNT: %
 LAT 47-07.0N SUN AM LY WAVE HGT M WET C WEATHER:
 LON 124-22.5W PM LY DIR REL HUMIDITY % VISIBILITY:
 DEPTH 51M TOTAL 398LY PER SEC SURF TEMP C TIDE: 1.5M FLOOD

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS	SIL	NO3	NO2	NH3	CHLA	PHAEO	FO/FA
				MGAT/L	ML/L	SAT	ADU	---MICROGRAM---	---ATOMS/LITER---				---MG/M3---		
1.0	15.32	30.567	22.52	.628	7.04	121	-.110	.00	.71	.00	.05	.03	.35	.04	1.71
5.0	15.32	30.570	22.52	.641	7.18	124	-.123	.00	.66	.00	.11	.06	.36	.03	1.75
9.0	14.88	30.714	22.72	.680	7.62	130	-.157	.05	.60	.00	.10	.08	.33	.05	1.70
15.0	10.50	31.915	24.48	.764	8.55	134	-.195	.05	.55	.00	.06	.02	.50	.08	1.68
20.0	9.32	32.267	24.95	.484	5.42	83	.099	1.08	8.21	9.48	.20	.52	6.43	1.80	1.63
25.0	8.57	32.631	25.35	.439	4.91	74	.152	1.55	27.31	18.36	.31	.82	.82	.68	1.44
30.0	8.26	32.863	25.58	.389	4.36	65	.205	1.81	33.75	22.57	.30	1.05	.56	.83	1.32
35.0	7.77	33.259	25.96	.323	3.62	54	.277	1.92	37.36	25.59	.64	.18	.23	.48	1.26
40.0	7.65	33.376	26.07	.314	3.51	52	.287	2.03	41.23	26.55	.47	.28	.16	.59	1.17
45.0	7.64	33.384	26.08	.307	3.43	51	.294	2.05	41.76	26.64	.38	.20	.21	.71	1.18
(0- 27.0M)													42.63	13.05MG/M2	

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-----CRUISE CY678 STATION 019-----

DATE 11 JUN 78 SECCHI 10.0M WIND SPD 13KT BARMETER 1018.2MB CLOUD TYPE:
TIME 1600(+07) PHOTIC 27.0M DIR 170 AIR DRY C AMOUNT: %
LAT 47-07.0N SUN AM LY WAVE HGT M WET C WEATHER:
LON 124-22.0W PM LY DIR REL HUMIDITY % VISIBILITY:
DEPTH 51M TOTAL 398LY PER SEC SURF TEMP C TIDE: 1.5M FLOOD

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----			PHOS	SIL	NO3	NO2	NH3	CHLA	PHAED	FO/FA
				MGAT/L	ML/L	SAT	AOU	---MICROGRAM---	ATOMS/LITER---			---MG/M3---		
1.0		30.518						.02	.65	.00	.15	.02	.64	.00 1.86
5.0		30.530						.02	.53	.00	.14	.02	.36	.03 1.75
8.0		30.563						.03	.54	.00	.13	.01	.34	.01 1.78
14.0		31.854						.18	.89	.21	.00	.00	1.23	.10 1.74
27.0		32.739						1.82	33.30	21.18	.25	1.42	.51	.84 1.30
(0-27.0M)													19.71	6.56MG/M2

C-14				-----SIMULATED IN SITU-----			
DEPTH M	CHLA ---MG/M3---	PHAED	FO/FA	LIGHT DEPTH %	-CARBON LIGHT MG/M3/(INCUB*)	ASSIM- DARK MG/M3/(INCUB*)	ASSIM/CHLA MG/MG/(HR OF LIGHT)
1.0	.64	.00	1.86	100.	63.75	2.65	6.12
5.0	.36	.03	1.75	50.	61.33	3.89	10.47
8.0	.34	.01	1.78	25.	71.93	1.55	13.00
14.0	1.23	.10	1.74	10.	144.09	2.23	7.20
27.0	.51	.84	1.30	1.	2.21	1.20	.27
(0-27.0M)	19.71	6.56MG/M2			2112.81MGC/M2/(INCUB*)		

SAMPLES INCUBATED FROM 1730, 11 JUNE TO 1800, 12 JUNE, INCLUDING
16.27 HR. OF DAYLIGHT.
SALINITIES DETERMINED FROM WATER BOTTLE SAMPLES.

STD PLOT
CY678 020

Latitude 47-07.0N
Longitude 124-18.1W
Program run: NCTL 0200 . 0000T

T = Temperature - C
S = Salinity - 0/00
sigma-t = Sigma-t
F = S-V or Chlorophyll
File: MNS020

Date 11 JUNE 1978
Begin 0010

-----CRUISE CY678 STATION 020-----

DATE 11 JUN 78 SECCHI 8.0M WIND SPD KT BAROMETER MB CLOUD TYPE:
 TIME 1830(+07) PHOTIC 21.6M DIR M AIR DRY C AMOUNT: %
 LAT 47-07.0N SUN AM LY WAVE HGT M WET C WEATHER:
 LON 124-18.1W PM LY DIR SEC REL HUMIDITY % VISIBILITY:
 DEPTH 37M TOTAL 398LY PER SURF TEMP C TIDE: 1.9M EBB

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----			PHOS	SIL	NO3	NO2	NH3	CHLA	PHAEO	FO/FA	
				MGAT/L	ML/L	SAT	AQU	---MICROGRAM---	---ATOMS/LITER---			---MG/M3---			
2.0	15.19	29.665	21.85	.627	7.02	120	-.104	.13	4.39	.08	.07	.00	1.23	.04	1.77
4.0	15.15	29.685	21.88	.616	6.90	118	-.093	.12	4.12	.01	.07	.00	1.18	.01	1.79
7.0	15.12	29.709	21.90	.616	6.89	118	-.093	.16	4.13	.02	.06	.00	1.18	.13	1.72
10.0	15.04	29.828	22.01	.624	6.99	119	-.100	.15	4.07	.02	.06	.00	1.08	.00	1.81
12.0	15.01	29.883	22.06	.631	7.07	120	-.107	.15	4.08	.09	.05	.03	1.28	.15	1.71
16.0	14.97	30.008	22.16	.633	7.09	121	-.109	.12	3.45	.00	.05	.00	1.08	.07	1.75
19.0	14.70	30.247	22.40	.630	7.05	120	-.104	.16	3.11	.00	.05	.00	.92	.10	1.72
22.0	13.03	31.373	23.60	.656	7.34	121	-.115	.14	1.06	.00	.04	.00	.87	.11	1.71
25.0	10.61	31.850	24.41	.713	7.98	126	-.145	.17	.67	.00	.03	.00	.53	.08	1.70
31.0	8.77	32.461	25.19	.430	4.82	73	.159	1.39	12.88	12.10	.09	.86	4.34	1.45	1.60
(0- 21.6M)													24.22	1.65MG/M2	

-----CRUISE CY678

STATION 021-----

DATE 11 JUN 78 SECCHI 5.0M WIND SPD 15KT BAROMETER 1018.6MB CLOUD TYPE:
 TIME 1410(+07) PHOTIC 13.5M DIR 170 AIR DRY C AMOUNT: %
 LAT 47-07.0N SUN AM LY WAVE HGT M WET C WEATHER:
 LON 124-15.0W PM LY DIR REL HUMIDITY % VISIBILITY:
 DEPTH 22M TOTAL 398LY PER SEC SURF TEMP C TIDE: 1.2M FLOOD

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS	SIL	NO3	NO2	NH3	CHLA	PHAEO	FO/FA
				MGAT/L	ML/L	SAT	AOU	---MICROGRAM---	---ATOMS/LITER---				---MG/M3---		
2.0	16.07	27.220	19.79	.591	6.62	113	-.070	.21	10.26	.00	.13	.43	1.67	.00	1.83
4.0	16.04	27.311	19.87	.582	6.52	112	-.061	.16	10.23	.00	.13	.25	2.05	.00	1.83
7.0	15.81	27.893	20.36	.589	6.60	113	-.067	.17	10.28	.00	.12	.22	1.90	.11	1.76
10.0	15.45	29.205	21.44	.587	6.57	113	-.066	.20	7.55	.00	.11	.18	1.03	.12	1.71
15.0	13.60	31.226	23.38	.663	7.43	124	-.128	.15	.42	.00	.10	.09	.48	.05	1.73
18.0	11.69	31.602	24.03	.627	7.02	113	-.072	.35	4.56	1.15	.09	.30	.90	.29	1.60

(0- 13.5M)

20.31 .84MG/M2

-----CRUISE CY678 STATION 022-----

DATE 11 JUN 78 SECCHI 4.0M WIND SPD 18KT BAROMETER 1018.3MB CLOUD TYPE:
 TIME 1330(+07) PHOTIC 10.0M DIR 160 AIR DRY C AMOUNT: %
 LAT 47-07.0N SUN AM LY WAVE HGT M WET C WEATHER:
 LON 124-13.0W PM LY DIR REL HUMIDITY % VISIBILITY:
 DEPTH 10M TOTAL 398LY PER SEC SURF TEMP C TIDE: .8M FLOOD

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS	SIL	NO3	NO2	NH3	CHLA	PHAEO	FO/FA
				MGAT/L	ML/L	SAT	AQU	---MICROGRAM---	---ATOMS/LITER---				---MG/M3---		
2.0	16.26	26.653	19.32	.582	6.52	112	-.061	.22	13.56	.00	.06	.41	.77	.01	1.79
3.0	16.25	26.636	19.31	.584	6.54	112	-.063	.18	13.61	.00	.10	.44	1.62	.19	1.72
5.0	16.25	26.634	19.31	.598	6.69	115	-.077	.18	13.66	.00	.12	.45	1.46	.32	1.66
8.0	16.24	26.629	19.31	.591	6.61	113	-.070	.18	13.72	.00	.15	.46	1.16	.14	1.71
(0- 10.0M)													12.07	1.60MG/M2	

1% LIGHT DEPTH ADJUSTED SO AS NOT TO EXCEED WATER DEPTH FOR INTEGRATIONS.

-----CRUISE CY978 STATION 007-----

DATE 07 SEP 78	SECCHI 22.0M	WIND SPD 8KT	BAROMETER 1010.0MB	CLOUD TYPE: CUMULUS
TIME 1630(+07)	PHOTIC 59.4M	DIR 210	AIR DRY C	AMOUNT: 20%
LAT 47-07.0N	SUN AM	WAVE HGT 1M	WET C	WEATHER: PARTLY CLOUDY
LON 125-45.0W	PM	DIR 300	REL HUMIDITY %	VISIBILITY: 20-50KM
DEPTH 1650M	TOTAL 457LY	PER 6SEC	SURF TEMP C	TIDE: M

NO STANDARD BOTTLE CAST WAS DONE AT THIS STATION.

THIS WAS A CTD CALIBRATION CAST WITH RESULTS AS FOLLOWS:

DEPTH		TEMPERATURE		SALINITY	
BOTTLE	CTD	BOTTLE	CTD	BOTTLE	CTD
0	0	16.95	16.90	32.071	32.060
296	297	5.50	5.45	33.917	33.917
	596	4.37	4.38	34.153	34.176
891	894	3.73	3.72	34.370	34.361
1183	1186	3.21	3.20	34.443	34.452
1475	1478	2.54	2.54	34.520	34.525

SAMPLES INCUBATED FROM 0450, 8 SEPTEMBER TO 0730, 9 SEPTEMBER,

Latitude 97-05.1N
Longitude 125-42.3M
Program run: NSCTD, RDSST

File: NS007X

Date: 7 SEP. 1978
Begin: 1620

Latitude 97-05.1N
Longitude 125-42.3M
Program run: NSCTD, RDSST

File: NS007X

Date: 7 SEP. 1978
Begin: 1620

-----CRUISE CY978

STATION 007-----

DATE 07 SEP 78 SECCHI 22.0M WIND SPD 10KT BARDMETER 1009.5MB CLOUD TYPE: CUMULUS
 TIME 1900(+07) PHOTIC 59.4M DIR 180 AIR DRY C AMOUNT: 70%
 LAT 47-08.4N SUN AM LY WAVE HGT 1M WET C WEATHER: PARTLY CLOUDY
 LON 125-42.9W PM LY DIR 300 REL HUMIDITY % VISIBILITY: 20-50KM
 DEPTH 1570M TOTAL 457LY PER 6SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS MICROGRAM	SIL MICROGRAM	NO3 ATOMS/LITER	NO2 ATOMS/LITER	NH3	CHLA MG/M3	PHAEO MG/M3	FO/FA
				MGAT/L	ML/L	SAT	AOU								
2.0	16.88	32.068	23.32					.30	2.29	.11	.03	.41	.10	.01	1.70
10.0	16.44	32.058	23.41	.517	5.80	103	-.015	.30	2.50	.11	.00	.39	.12	.00	1.79
20.0	16.25	32.050	23.45	.512	5.73	102	-.008	.30	2.49	.10	.00	.34	.11	.01	1.74
25.0	14.99	32.156	23.81	.527	5.90	102	-.010	.33	2.77	.09	.01	.38	.21	.02	1.74
31.0	12.18	32.385	24.55	.562	6.29	103	-.015	.55	5.14	1.58	.09	.32	.61	.03	1.76
39.0	10.47	32.600	25.02	.504	6.76	106	-.037	.66	6.33	3.15	.12	.48	.60	.10	1.69
50.0	9.29	32.644	25.25	.577	6.46	99	.004	.86	8.38	6.84	.20	.31	.61	.08	1.70
60.0	8.96	32.713	25.36	.570	6.39	97	.015	.94	9.31	7.63	.44	.29	.31	.06	1.67
75.0	8.41	32.771	25.49	.544	6.09	92	.049	1.14	12.12	11.02		.15	.11	.04	1.58
100.0	7.46	33.156	25.93	.473	5.30	78	.131	1.47	21.89	18.59	.01	.12	.03	.03	1.40
(0- 59.4M)															
													21.39	2.51MG/M2	

STD PLOT CY976 008

Latitude 97-07.0N
Longitude 125-37.5W
Program run: NSCTD, REBOT

File: M9008X

Date: 7 SEP. 1976
Begin: 1850

STD PLOT CY976 008

Latitude 97-07.0N
Longitude 125-37.5W
Program run: NSCTD, REBOT

File: M9008X

Date: 7 SEP. 1976
Begin: 1850

-----CRUISE CY978

STATION 008-----

DATE 07 SEP 78 SECCHI M WIND SPD 10KT BARDOMETER 1009.5MB CLOUD TYPE: CUMULUS
 TIME 2020(+07) PHOTIC M DIR 180 AIR DRY C AMOUNT: 70%
 LAT 47-07.0N SUN AM LY WAVE HGT 1M WET C WEATHER: PARTLY CLOUDY
 LON 125-37.5W PM LY DIR 300 REL HUMIDITY % VISIBILITY: 20-50KM
 DEPTH 1710M TOTAL 457LY PER 6SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS	SIL	NO3	NO2	NH3	CHLA	PHAED	FO/FA
				MGAT/L	ML/L	SAT	ADU	---MICROGRAM---	---ATOMS/LITER---				---MG/M3---		
1.0	16.68	32.061	23.36	.507	5.68	101	-.007	.29	2.58	.09	.00	.11	.11	.00	1.81
10.0	16.53	32.035	23.37	.510	5.71	102	-.009	.26	2.57	.07	.00	.13	.10	.00	1.77
19.0	16.26	32.056	23.45	.515	5.77	102	-.011	.25	2.56	.07	.01	.10	.16	.01	1.77
25.0	13.87	32.201	24.07	.532	5.96	101	-.004	.38	3.63	.14	.01	.08	.53	.01	1.79
29.0	12.64	32.234	24.34	.570	6.39	105	-.028	.49	5.44	1.46	.07	.11	.70	.00	1.80
39.0	9.89	32.524	25.06	.528	5.92	92	.046	.81	8.55	5.59	.16	.07	.72	.22	1.61
50.0	9.02	32.654	25.30	.579	6.49	99	.006	.93	9.64	8.43	.15	.07	.43	.08	1.67
60.0	8.79	32.708	25.38	.548	6.14	93	.040	1.00	10.67	9.76	.14	.10	.26	.06	1.65
75.0	8.37	32.843	25.55	.515	5.76	87	.078	1.16	13.72	12.89	.07	.12	.16	.08	1.54
99.0	7.71	33.061	25.82	.444	4.97	74	.158	1.53	22.89	18.94	.10	.12	.05	.07	1.35

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-----CRUISE CY978 STATION 009-----

DATE 08 SEP 78 SECCHI M WIND SPD KT BARMETER MB CLOUD TYPE:
 TIME 0400(+07) PHOTIC 59.4M DIR HGT M AIR DRY C AMOUNT: %
 LAT 47-07.0N SUN AM LY WAVE HGT M WET C WEATHER:
 LON 125-30.0W PM LY DIR PER SEC REL HUMIDITY % VISIBILITY:
 DEPTH M TOTAL 115LY PER SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL O/GO	SIG-T	-----OXYGEN----- MGAT/L ML/L SAT	AGU	PHOS ---MICROGRAM---	SIL ---ATOMS/LITER---	NO3	NO2	NH3	CHLA ---MG/M3---	PHAEO	FG/FA
1.0		32.093				.27	2.78	.00	.03	.01	.09	.00	1.77
9.0		32.084				.30	2.78	.00	.04	.03	.11	.02	1.67
18.0		32.087				.29	2.78	.05	.02	.02	.10	.01	1.72
30.0		32.314				.35	4.22	.00	.02	.01	.49	.05	1.72

-----SIMULATED IN SITU-----

C-14 DEPTH M	CHLA ---MG/M3---	PHAEO	FG/FA	LIGHT % MG/M3/(INCUB*)	-CARBON ASSIM- LIGHT DARK	ASSIM/CHLA MG/MG/(HR OF LIGHT)
1.0	.09	.00	1.77	100.	6.80	.36
9.0	.11	.02	1.67	50.	5.38	.37

SAMPLES INCUBATED FROM 0450, 8 SEPTEMBER TO 0730, 9 SEPTEMBER,
 INCLUDING 15.63 HR. OF DAYLIGHT.
 PRODUCTIVITY SAMPLES FROM 18M AND 30M WERE LOST DUE TO BREAKAGE
 DURING A STORM.
 SALINITIES DETERMINED FROM WATER BOTTLE SAMPLES.

STD PLOT CY978 010

Lat/Long 97-07.0N
Long/Time 125-22.0W
Program run: NSCTD, F0207

File: NS010X

Date: 11 SEP. 1976
Depth: 15

STD PLOT CY978 010

Lat/Long 97-07.0N
Long/Time 125-22.0W
Program run: NSCTD, F0207

File: NS010X

Date: 11 SEP. 1976
Depth: 15

-----CRUISE CY978

STATION 010-----

DATE 11 SEP 78 SECCHI M WIND SPD 15KT BAROMETER 1014.1MB CLOUD TYPE: STRATOCUMULUS
 TIME 0040(+07) PHOTIC M DIR 210 AIR DRY C AMOUNT: 100%
 LAT 47-07.0N SUN AM LY WAVE HGT 2M WET C WEATHER: UNBROKEN CLOUD LAYER
 LON 125-22.8W PM LY DIR 260 REL HUMIDITY % VISIBILITY: 20-50KM
 DEPTH 1609M TOTAL LY PER 8SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS	SIL	NO3	NO2	NH3	CHLA	PHAED	FG/FA
				MGAT/L	ML/L	SAT	AOU	---MICROGRAM---	---ATOMS/LITER---				---MG/M3---		
1.0	15.98	32.101	23.55	.556	6.23	110	-.050	.33	2.88	.00	.02	.01	.18	.00	1.82
10.0	15.98	32.100	23.55	.554	6.20	109	-.047	.33	2.88	.00	.03	.01	.18	.01	1.77
19.0	15.86	32.098	23.57	.550	6.16	108	-.042	.33	2.88	.00	.03	.03	.20	.01	1.75
25.0	15.52	32.142	23.68	.557	6.23	109	-.045	.30	2.88	.00	.03	.03	.22	.03	1.70
29.0	14.18	32.284	24.07	.595	6.67	113	-.070	.36	3.47	.02	.04	.04	.41	.00	1.81
40.0	10.27	32.588	25.05	.654	7.33	115	-.085	.61	5.89	2.01	.09	.11	.66	.01	1.79
51.0	9.34	32.599	25.21	.611	6.84	105	-.030	.82	8.24	5.73	.37	.06	.67	.08	1.71
59.0	9.06	32.633	25.28	.588	6.58	101	-.003	.92	9.37	7.98	.28	.04	.47	.04	1.74
75.0	8.52	32.750	25.45	.569	6.37	96	.022	1.04	12.36	11.10	.04	.03	.15	.03	1.66
99.0	7.87	33.016	25.76	.514	5.76	86	.085	1.40	18.43	16.50	.04	.00	.04	.03	1.47

Lat/Long: 47-07.0N
125-06.0E
Program run: NECTO. PRINT

File: NS012X

Date: 10 SEP. 1976
Page: 2220

Lat/Long: 47-07.0N
125-06.0E
Program run: NECTO. PRINT

File: NS012X

Date: 10 SEP. 1976
Page: 2220

-----CRUISE CY978 STATION 012-----

DATE 10 SEP 78 SECCHI M WIND SPD 12KT BARMETER 1013.0MB CLOUD TYPE: CUMULUS
 TIME 2250(+07) PHOTIC M DIR 240 AIR DRY C AMOUNT: 90%
 LAT 47-07.0N SUN AM LY WAVE HGT 2M WET C WEATHER: UNBROKEN CLOUD LAYER
 LON 125-08.0W PM LY DIR 260 REL HUMIDITY % VISIBILITY: 20-50KM
 DEPTH 1450M TOTAL LY PER 6SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS --MICROGRAM--	SIL	NO3 --ATOMS/LITER--	NO2	NH3	CHLA --MG/M3--	PHAED	FO/FA
				MGAT/L	ML/L	SAT	AOU								
2.0	16.08	32.044	23.48	.561	6.28	111	-.055	.29	2.80	.02	.00	.00	.22	.02	1.72
10.0	16.08	32.045	23.48	.574	6.43	114	-.068	.30	2.80	.00	.02	.00	.21	.03	1.70
19.0	15.97	32.042	23.50	.570	6.38	112	-.063	.30	2.73	.02	.00	.00	.23	.03	1.71
24.0	15.95	32.042	23.51	.558	6.25	110	-.051	.32	2.68	.02	.06	.07	.25	.03	1.71
30.0	14.19	32.193	24.00	.581	6.50	111	-.056	.41	4.29	.73	.05	.04	.49	.07	1.70
40.0	10.23	32.487	24.97	.618	6.92	108	-.048	.73	7.92	3.79	.18	.01	.81	.10	1.71
50.0	9.32	32.603	25.21	.601	6.73	103	-.020	.87	9.04	7.24	.11	.01	.57	.10	1.68
59.0	8.97	32.695	25.34	.607	6.80	104	-.021	.91	9.45	8.53	.16	.00	.26	.06	1.65
75.0	8.32	32.832	25.55	.598	6.70	101	-.005	1.15	14.00	12.98	.05	.00	.09	.05	1.53
99.0	7.91	33.104	25.82	.510	5.71	85	.089	1.38	19.28	17.38	.05	.01	.05	.02	1.55

Latitude 47-07.0N
Longitude 124-33.2E
Program run: NSCTD, NSNET

File: NS014X

Date 10 SEP. 1976
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Latitude 47-07.0N
Longitude 124-33.2E
Program run: NSCTD, NSNET

File: NS014X

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-----CRUISE CY978

STATION 014-----

DATE 10 SEP 78 SECCHI M WIND SPD 12KT BARMETER 1013.1MB CLOUD TYPE: CUMULUS
 TIME 2055(+07) PHOTIC M DIR 230 AIR DRY C AMOUNT: 70%
 LAT 47-07.0N SUN AM LY WAVE HGT 2M WET C WEATHER: PARTLY CLOUDY
 LON 124-53.2W PM LY DIR 270 REL HUMIDITY % VISIBILITY: 20-50KM
 DEPTH 144M TOTAL LY PER 6SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS	SIL	NO3	NO2	NH3	CHLA	PHAED	FO/FA
				MGAT/L	ML/L	SAT	AOU	---MICROGRAM---	---ATOMS/LITER---				---MG/M3---		
2.0	16.03	32.094	23.53	.557	6.24	110	-.051	.28	3.02	.00	.05	.00	.17	.04	1.64
10.0	16.03	32.095	23.53	.560	6.27	111	-.053	.36	2.95	.00	.02	.00	.16	.02	1.72
20.0	15.76	32.126	23.61	.527	5.90	104	-.018	.29	3.17	.00	.02	.00	.22	.03	1.70
25.0	14.88	32.230	23.89	.589	6.59	114	-.071	.37	3.62	.18	.03	.01	.32	.08	1.64
30.0	13.48	32.290	24.22	.590	6.60	111	-.057	.43	4.51	.80	.06	.20	.52	.07	1.70
39.0	9.28	32.618	25.23	.595	6.66	102	-.013	.89	8.64	6.89	.23	.06	.46	.11	1.64
49.0	8.69	32.705	25.39	.562	6.30	95	.027	1.07	11.52	10.55	.13	.00	.35	.01	1.77
61.0	8.19	32.847	25.58	.533	5.97	90	.062	1.33	16.86	14.70	.11	.00	.14	.04	1.63
74.0	7.78	33.051	25.80	.478	5.35	80	.122	1.61	22.98	19.17	.08	.00	.06	.05	1.42
100.0	7.55	33.482	26.17	.401	4.49	67	.200	1.75	29.85	23.01	.08	.00	.04	.04	1.40

Lat/Time 97-07.09
Long/Time 124-36.14
Program run: HECTO, HENDT

File: HSO16X

Date: 10 SEP. 1978
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Lat/Time 97-07.09
Long/Time 124-36.14
Program run: HECTO, HENDT

File: HSO16X

Date: 10 SEP. 1978
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-----CRUISE CY978 STATION 016-----

DATE 10 SEP 78 SECCHI M WIND SPD 8KT BAROMETER 1012.0MB CLOUD TYPE: CUMULUS
 TIME 1905(+07) PHOTIC M DIR 200 AIR DRY C AMOUNT: 50%
 LAT 47-07.0N SUN AM LY WAVE HGT 2M WET C WEATHER: PARTLY CLOUDY
 LON 124-38.4W PM LY DIR 250 REL HUMIDITY % VISIBILITY: 10-20KM
 DEPTH 95M TOTAL LY PER 6SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS	SIL	NO3	NO2	NH3	CHLA	PHAED	FO/FA
				MGAT/L	ML/L	SAT	ADU	---MICROGRAM---	---ATOMS/LITER---				---MG/M3---		
1.0	15.55	32.085	23.63	.579	6.49	113	-.068	.40	3.86	.05	.03	.20	.49	.05	1.72
9.0	15.49	32.083	23.64	.586	6.56	114	-.074	.29	3.86	.05	.03	.12	.63	.00	1.82
14.0	15.44	32.080	23.65	.579	6.48	113	-.067	.31	4.00	.18	.06	.11	.68	.00	1.84
20.0	15.41	32.088	23.66	.549	6.15	107	-.036	.31	4.14	.39	.07	.12	.61	.00	1.81
24.0	15.37	32.099	23.68	.566	6.34	110	-.053	.35	4.22	.40	.07	.11	.50	.04	1.74
29.0	15.21	32.126	23.74	.553	6.19	107	-.039	.57	4.58	.68	.09	.11	.57	.05	1.73
39.0	12.96	32.292	24.33	.506	5.67	94	.032	.75	10.89	5.82	.29	1.41	.70	.07	1.73
49.0	8.73	32.953	25.58	.364	4.07	62	.224	1.92	32.17	23.87	.12	.08	.18	.21	1.37
59.0	7.50	33.318	26.05	.372	4.17	62	.231	2.06	35.16	26.45	.09	.14	.05	.15	1.19
82.0	7.41	33.628	26.30	.320	3.58	53	.283	2.54	49.04	30.54	.08	.08	.05	.24	1.14

Lat/Long 49-07.0N
Long/Date 124-05.0E
Program run: NCTB, NCTB

File: NS018X

Date: 10 SEP. 1978
Depth: 1700

Lat/Long 49-07.0N
Long/Date 124-05.0E
Program run: NCTB, NCTB

File: NS018X

Date: 10 SEP. 1978
Depth: 1700

-----CRUISE CY978

STATION 018-----

DATE 10 SEP 78 SECCHI 10.0M WIND SPD 10KT BAROMETER 1011.0MB CLOUD TYPE: CUMULUS
 TIME 1725(+07) PHOTIC 27.0M DIR 200 AIR DRY C AMOUNT: 40%
 LAT 47-07.0N SUN AM LY WAVE HGT 2M WET C WEATHER: PARTLY CLOUDY
 LON 124-25.2W PM LY DIR 250 REL HUMIDITY % VISIBILITY: 20-50KM
 DEPTH 57M TOTAL LY PER 6SEC SURF TEMP C TIDE: 2.1M FLOOD

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS --MICROGRAM--	SIL	NO3 --ATOMS/LITER---	NO2	NH3	CHLA --MG/M3---	PHAEO	FO/FA
				MGAT/L	ML/L	SAT	AOU								
2.0	15.19	32.026	23.66	.565	6.33	110	-.050	.41	6.36	.68	.06	.17	1.14	.01	1.80
5.0	15.18	32.026	23.66	.566	6.34	110	-.051	.34	6.29	.67	.07	.14	1.04	.16	1.70
10.0	15.04	32.023	23.69					.32	6.21	.61	.08	.13	1.24	.01	1.79
16.0	14.87	32.051	23.75	.558	6.25	108	-.040	.33	5.76	.51	.07	.13	1.53	.06	1.77
20.0	14.84	32.054	23.76	.556	6.23	107	-.037	.34	5.76	.63	.08	.15	1.40	.08	1.75
25.0	14.79	32.058	23.77	.554	6.20	107	-.035	.36	5.91	.77	.08	.11	.98	.33	1.60
30.0	14.69	32.067	23.80	.555	6.22	107	-.035	.33	6.06	.97	.09	.11	1.14	.11	1.73
34.0	14.63	32.076	23.82	.557	6.24	107	-.037	.36	6.14	1.20	.10	.17	1.17	.03	1.78
40.0	11.40	32.416	24.72	.476	5.33	86	.080	.90	12.78	7.93	.38	1.11	.49	.15	1.62
46.0	9.35	32.883	25.43	.362	4.06	62	.218	1.86	32.86	20.92	.31	.80	.23	.42	1.29
													33.39	2.79MG/M2	

(0- 27.0M)

Latitude 47-07.0N
Longitude 129-17.34
Program run: NSCTD, NSNET

File: NS020X

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Latitude 47-07.0N
Longitude 129-17.34
Program run: NSCTD, NSNET

File: NS020X

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-----CRUISE CY978

STATION 020-----

DATE 10 SEP 78 SECCHI 9.0M WIND SPD 12KT BAROMETER 1010.0MB CLOUD TYPE: CUMULUS
 TIME 1420(+07) PHOTIC 24.3M DIR 200 AIR DRY C AMOUNT: 20%
 LAT 47-07.0N SUN AM LY WAVE HGT 2M WET C WEATHER: PARTLY CLOUDY
 LON 124-17.2W PM LY DIR 250 REL HUMIDITY % VISIBILITY: 20-50KM
 DEPTH 33M TOTAL LY PEK 8SEC SURF TEMP C TIDE: 1.3M FLOOD

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS --MICROGRAM--	SIL	NO3 --ATOMS/LITER--	NO2	NH3	CHLA --MG/M3--	PHAED	FO/FA
				MGAT/L	ML/L	SAT	AQU								
3.0	16.09	27.631	20.10	.585	6.56	113	-.066	.31	17.54	.00	.03	.14	2.58	.89	1.59
4.0	16.08	27.634	20.11	.581	6.51	112	-.062	.36	17.63	.00	.02	.13	2.75	.43	1.69
7.0	16.06	27.630	20.11	.596	6.68	115	-.076	.32	17.81	.00	.03	.14	2.47	.34	1.70
10.0	15.94	27.658	20.16	.586	6.57	112	-.065	.35	17.81	.00	.05	.18	2.63	.88	1.60
13.0	15.85	27.804	20.29	.584	6.54	112	-.062	.35	17.90	.02	.07	.21	2.87	.32	1.72
17.0	15.79	27.857	20.34	.566	6.34	108	-.044	.45	18.35	.16	.09	.66	3.69	.00	1.81
21.0	15.65	29.474	21.61	.552	6.18	106	-.034	.50	15.85	.39	.07	1.16	2.28	.33	1.70
25.0	15.52	30.389	22.34	.553	6.20	107	-.036	.37	11.13	.33	.04	.78	1.04	.21	1.67
(0- 24.3M)													65.03	10.34MG/M2	

-----CRUISE CY978 STATION 020-----

DATE 10 SEP 78 SECCHI 9.0M WIND SPD 12KT BARMETER 1010.0MB CLOUD TYPE: CUMULUS
 TIME 1600(+07) PHOTIC 24.0M DIR 200 AIR DRY C AMOUNT: 20%
 LAT 47-07.0N SUN AM LY WAVE HGT 2M WET C WEATHER: PARTLY CLOUDY
 LON 124-17.2W PM LY DIR 250 REL HUMIDITY % VISIBILITY: 20-50KM
 DEPTH 33M TOTAL LY PER 8SEC SURF TEMP C TIDE: 1.3M FLOOD

DEPTH M	TEMP C	SAL 0/00	SIG-T	-----OXYGEN----- MGAT/L ML/L SAT	AQU	PHOS ---MICROGRAM---	SIL ---ATOMS/LITER---	NO3	NO2	NH3	CHLA ---MG/M3---	PHAED	FO/FA
3.0		27.623				.31	17.09	.00	.04	.18	3.10	.60	1.67
6.0		27.592				.32	17.99	.00	.04	.25	3.92	.90	1.65
10.0		27.707				.34	18.35	.04	.04	.23	3.39	.44	1.71
20.0		29.666				.56	13.28	.28	.03	.62	1.07	.28	1.63
(0- 24.0M)											61.03	11.45MG/M2	

C-14 DEPTH M	CHLA ---MG/M3---	PHAED	FO/FA	-----SIMULATED IN SITU----- LIGHT -CARBON ASSIM- ASSIM/CHLA DEPTH LIGHT DARK MG/MG/(HR % MG/M3/(INCUB*) OF LIGHT)
3.0	3.10	.60	1.67	50. 79.65 6.87 1.94
6.0	3.92	.90	1.65	25. 299.26 8.33 5.76
10.0	3.39	.44	1.71	10. 330.75 3.03 7.36
20.0	1.07	.28	1.63	1. 6.24 1.07 .44
(0- 24.0M)	61.03	11.45MG/M2		3764.77MGC/M2/(INCUB*)

SAMPLES INCUBATED FROM 1640, 10 SEPTEMBER TO 1700, 11 SEPTEMBER,
 INCLUDING 13.25 HR. OF DAYLIGHT.
 SALINITIES DETERMINED FROM WATER BOTTLE SAMPLES.

Phytoplankton Species Composition

This section presents the results of the phytoplankton enumeration done for the three R/V CAYUSE cruises. Samples were examined to quantify the dominant types and size composition of phytoplankton observed at selected stations and depths along the sampling transect. Cells were measured in their longest dimension and tabulated by genus (or class) and size category (< 10, 10-20, 20-40, 40-70, > 70 μm).

Samples from cruise CY-378 were counted by four different people, all relative beginners who had different skill levels in identifying the phytoplankton. Thus there may be more variability in the counts of different samples for this cruise than for CY-678 or CY-978, each of which was examined by only one person. In general, the counts are probably more accurate with respect to size composition than with respect to species composition.

The results are presented in tabular form and show the number of cells per liter of various categories of phytoplankton observed in the samples. The size categories represent the longest dimension of the individual cells (not chain lengths for chain-forming organisms) in micrometers.

CRUISE: CY-378 STATION: 009 SAMPLE DEPTH: 7 m LATITUDE: 47°07.0'N
 LOCAL TIME AND DATE: 1620 31 March 1978 LONGITUDE: 125°30.9'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Centric diatoms:					
Bacteriastrum	-	240	-	-	-
Chaetoceros	1,440	-	-	-	-
Thalassiosira	3,200	1,040	640	80	-
Pennate diatoms:					
Asterionella	-	240	-	-	-
Navicula/like	1,600	7,840	-	-	-
Nitzschia	5,680	3,600	6,240	-	-
Thalassionema	-	-	80	-	-
Misc. Pennates	1,280	4,960	-	-	-
Dinoflagellates:					
Gymnodinium	77,200	5,360	160	-	-
Gyrodinium	9,280	1,520	80	-	-
Coccolithophores:					
Coccolithus huxleyi	3,885,480	-	-	-	-
Silicoflagellates:					
Distephanus speculum	-	80	-	-	-
Ebria tripartita	-	240	-	-	-
Microflagellates	949,440	-	-	-	-

CRUISE: CY-378 STATION: 009 SAMPLE DEPTH: 22 m LATITUDE: 47°07.0'N

LOCAL TIME AND DATE: 1620 31 March 1978 LONGITUDE: 125°30.9'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Centric diatoms:					
Bacteriastrum	-	480	-	-	-
Chaetoceros	480	-	-	-	-
Coscinodiscus	-	480	-	-	-
Thalassiosira	4,920	240	-	-	-
Pennate diatoms:					
Fragilaria	-	-	480	-	-
Navicula/like	11,400	10,200	600	-	-
Nitzschia	11,280	1,920	18,840	-	-
Thalassionema	-	-	240	-	-
Misc. Pennates	1,920	7,800	240	-	-
Unidentified diatoms	-	240	-	-	-
Dinoflagellates:					
Gymnodinium	103,560	5,880	-	-	-
Gyrodinium	6,840	2,520	-	-	-
Misc. Dinoflagellates	120	-	-	-	-
Coccolithophores:					
Coccolithus huxleyi	2,231,700	-	-	-	-
Misc. Coccolithophores	480	360	-	-	-
Silicoflagellates:					
Distephanus speculum	-	1,080	-	-	-
Ebria tripartita	-	360	-	-	-
Microflagellates	1,225,500	10,320	-	-	-

CRUISE: CY-378 STATION: 010 SAMPLE DEPTH: 40 m LATITUDE: 47°06.5'N

LOCAL TIME AND DATE: 1830 31 March 1978 LONGITUDE: 125°23.3'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Centric diatoms:					
Bacteriastrum	1,280	-	-	-	-
Chaetoceros	160	-	-	-	-
Coscinodiscus	-	160	80	-	-
Rhizosolenia	80	240	80	-	80
Thalassiosira	-	1,280	240	80	-
Pennate diatoms:					
Navicula/like	80	80	480	-	-
Nitzschia	1,600	960	2,400	6,720	1,200
Thalassionema/like	320	1,120	960	480	80
Thalassiothrix	-	-	-	-	80
Misc. Pennates	1,920	2,320	800	-	-
Unidentified diatoms	2,880	2,960	-	-	-
Dinoflagellates:					
Gymnodinium	19,280	3,280	160	-	-
Gyrodinium	2,960	1,600	-	-	-
Peridinium/like	80	-	-	-	-
Prorocentrum	-	160	-	-	-
Coccolithophores:					
Coccolithus huxleyi	93,840	-	-	-	-
C. pelagicus	160	4,240	-	-	-
Misc. Coccolithophoroo	80	-	-	-	-
Silicoflagellates:					
Distephanus speculum	-	160	80	-	-
Microflagellates	428,280	12,900	-	-	-

CRUISE: CY-378 STATION: 011 SAMPLE DEPTH: 20 m LATITUDE: 47°07.0'N

LOCAL TIME AND DATE: 2012 31 March 1978 LONGITUDE: 125°16.4'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Centric diatoms:					
Coscinodiscus	-	-	80	-	-
Thalassiosira	-	320	320	-	-
Pennate diatoms:					
Navicula/like	-	-	80	-	-
Nitzschia	10,400	960	80	80	-
Thalassionema/like	-	2,480	2,160	80	-
Misc. Pennates	-	960	1,360	-	-
Dinoflagellates:					
Gymnodinium	28,400	2,000	-	80	-
Gyrodinium	2,240	160	-	-	-
Coccolithophores:					
Coccolithus huxleyi	84,560	-	-	-	-
C. pelagicus	-	400	-	-	-
Silicoflagellates:					
Distephanus speculum	-	80	-	-	-
Microflagellates	343,140	-	-	-	-

CRUISE: CY-378 STATION: 013 SAMPLE DEPTH: 0 m LATITUDE: 47°07.0'N
 LOCAL TIME AND DATE: 2345 31 March 1978 LONGITUDE: 125°01.7'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Centric diatoms:					
Rhizosolenia	-	240	-	-	80
Thalassiosira	480	400	560	240	-
Misc. Centrics	2,240	720	-	-	-
Pennate diatoms:					
Nitzschia/like	18,640	80	80	-	-
Thalassionema/like	-	720	560	160	-
Misc. Pennates	-	2,480	160	400	-
Dinoflagellates:					
Gymnodinium/Gyrodinium	5,680	4,720	800	-	-
Misc. Dinoflagellates	240	240	80	-	-
Coccolithophores:					
Coccolithus huxleyi	90,720	-	-	-	-
Misc. Coccolithophores	5,040	320	-	-	-
Microflagellates	207,700	3,100	-	-	-
Unidentified phytoplankton	170,740	3,100	-	-	-

CRUISE: CY-378 STATION: 015 SAMPLE DEPTH: 30 m LATITUDE: 47°07.0'N

LOCAL TIME AND DATE: 0420 1 April 1978

LONGITUDE: 124°47.2'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Centric diatoms:					
Chaetoceros	80	-	-	-	-
Rhizosolenia	-	80	80	-	80
Thalassiosira	80	240	400	320	-
Misc. Centrics	480	640	-	-	-
Pennate diatoms:					
Navicula/like	-	80	-	-	-
Nitzschia/like	400	-	-	-	-
Thalassionema/like	-	160	320	-	-
Misc. Pennates	-	320	320	160	-
Dinoflagellates:					
Gonyaulax/Peridinium	-	80	-	-	-
Gymnodinium/Gyrodinium	17,600	11,280	80	-	-
Misc. Dinoflagellates	240	2,000	-	-	-
Coccolithophores:					
Coccolithus huxleyi	52,880	-	-	-	-
C. pelagicus	-	560	-	-	-
Misc. Coccolithophores	1,120	160	-	-	-
Microflagellates	144,480	6,200	-	-	-
Unidentified phytoplankton	203,660	900	160	-	-

CRUISE: CY-378 STATION: 15C SAMPLE DEPTH: 1 m LATITUDE: 47°07.0'N

LOCAL TIME AND DATE: 1017 4 April 1978

LONGITUDE: 124°50.0'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Centric diatoms:					
Bacteriastrum	-	1,000	-	-	-
Chaetoceros	200	-	-	-	-
Coscinodiscus	-	100	-	-	-
Thalassiosira	1,600	-	-	-	-
Pennate diatoms:					
Navicula/like	500	-	-	-	-
Nitzschia	-	7,900	-	-	-
Thalassionema	4,600	1,900	-	-	-
Dinoflagellates:					
Gymnodinium	30,000	1,700	-	-	-
Gyrodinium	2,600	200	-	-	-
Prorocentrum	-	300	-	-	-
Misc. Dinoflagellates	-	100	-	-	-
Coccolithophores:					
Coccolithus huxleyi	153,000	-	-	-	-
Misc. Coccolithophores	200	-	-	-	-
Silicoflagellates:					
Distephanus speculum	300	-	-	-	-
Ebria tripartita	200	-	-	-	-
Microflagellates	667,880	-	-	-	-

CRUISE: CY-378 STATION: 15C SAMPLE DEPTH: 4.5 m LATITUDE: 47°07.0'N

LOCAL TIME AND DATE: 1017 4 April 1978 LONGITUDE: 124°50.0'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Centric diatoms:					
Bacteriastrum	-	900	-	-	-
Chaetoceros	100	-	-	-	-
Thalassiosira	1,300	200	-	-	-
Pennate diatoms:					
Navicula/like	1,200	-	-	-	-
Nitzschia	-	-	2,800	300	-
Thalassionema	500	600	300	-	-
Misc. Pennates	5,900	1,200	100	-	-
Dinoflagellates:					
Gymnodinium	20,600	1,100	-	-	-
Gyrodinium	2,600	800	-	-	-
Prorocentrum	-	100	-	-	-
Coccolithophores:					
Coccolithus huxleyi	139,500	-	-	-	-
Misc. Coccolithophores	300	-	-	-	-
Silicoflagellates:					
Distephanus speculum	-	100	-	-	-
Ebria tripartita	200	-	-	-	-
Microflagellates	807,120	-	-	-	-

CRUISE: CY-378 STATION: 15C SAMPLE DEPTH: 8 m LATITUDE: 47°07.0'N

LOCAL TIME AND DATE: 1017 4 April 1978 LONGITUDE: 124°50.0'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Centric diatoms:					
Bacteriastrum	-	1,200	-	-	-
Thalassiosira	2,200	-	-	-	-
Pennate diatoms:					
Navicula/like	100	-	-	-	-
Nitzschia	-	1,400	1,900	-	-
Thalassionema	4,000	1,800	600	-	-
Dinoflagellates:					
Gymnodinium	27,000	1,900	-	-	-
Gyrodinium	2,500	500	-	-	-
Peridinium	200	-	-	-	-
Coccolithophores:					
Coccolithus huxleyi	137,000	-	-	-	-
Misc. Coccolithophores	200	-	-	-	-
Silicoflagellates:					
Distephanus speculum	-	200	-	-	-
Ebria tripartita	-	200	-	-	-
Microflagellates	448,400	-	-	-	-

CRUISE: CY-378 STATION: 15C SAMPLE DEPTH: 15 m LATITUDE: 47°07.0'N

LOCAL TIME AND DATE: 1017 4 April 1978

LONGITUDE: 124°50.0'W

Numbers in table are cells/liter

	<u><10 µm</u>	<u>10-20 µm</u>	<u>20-40 µm</u>	<u>40-70 µm</u>	<u>>70 µm</u>
Centric diatoms:					
Bacteriastrum	1,920	-	-	-	-
Chaetoceros	240	-	-	-	-
Coscinodiscus	240	240	-	-	-
Rhizosolenia	-	120	-	-	-
Thalassiosira	4,440	120	-	-	-
Pennate diatoms:					
Navicula/like	4,560	9,480	1,080	-	-
Nitzschia	4,680	720	29,160	120	-
Thalassionema	-	-	960	-	-
Misc. Pennates	1,200	11,400	120	-	-
Dinoflagellates:					
Gymnodinium	81,480	9,600	120	-	-
Gyrodinium	3,840	2,040	-	-	-
Misc. Dinoflagellates	240	-	-	-	-
Coccolithophores:					
Misc. Coccolithophores	120	-	-	-	-
Silicoflagellates:					
Distephanus speculum	-	120	-	-	-
Ebria tripartita	-	240	-	-	-
Microflagellates	1,390,620	-	-	-	-

CRUISE: CY-378 STATION: 018 SAMPLE DEPTH: 6 m LATITUDE: 47°07.0'N
 LOCAL TIME AND DATE: 0815 1 April 1978 LONGITUDE: 124°26.8'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Centric diatoms:					
Coscinodiscus	-	-	480	-	-
Rhizosolenia	-	160	-	320	1,920
Thalassiosira	1,280	6,080	3,520	-	-
Misc. Centrics	20,160	16,320	320	320	-
Pennate diatoms:					
Navicula/like	-	480	-	-	-
Nitzschia/like	65,760	1,280	480	160	-
Thalassionema/like	-	8,160	8,000	1,920	-
Misc. Pennates	960	13,920	4,160	2,560	-
Dinoflagellates:					
Gonyaulax/Peridinium	160	160	-	-	-
Gymnodinium/Gyrodinium	25,600	8,480	640	480	-
Misc. Dinoflagellates	1,920	2,720	-	-	-
Coccolithophores:					
Coccolithus huxleyi	286,880	-	-	-	-
C. pelagicus	-	160	-	-	-
Misc. Coccolithophores	9,280	480	-	-	-
Microflagellates	244,900	9,300	-	-	-
Unidentified phytoplankton	316,360	4,060	1,120	160	1,440

CRUISE: CY-378 STATION: 020 SAMPLE DEPTH: 3 m LATITUDE: 47°07.0'N

LOCAL TIME AND DATE: 1438 1 April 1978 LONGITUDE: 124°18.0'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Centric diatoms:					
Chaetoceros	160	-	-	-	-
Coscinodiscus	-	400	240	-	-
Rhizosolenia	-	-	240	-	2,080
Thalassiosira	6,000	53,280	2,880	80	-
Pennate diatoms:					
Nitzschia	-	-	1,280	240	-
Thalassionema	-	27,360	34,080	240	-
Misc. Pennates	160	10,640	9,200	720	-
Dinoflagellates:					
Gymnodinium	34,800	14,560	1,440	-	-
Gyrodinium	-	640	80	-	-
Peridinium	-	640	160	-	-
Coccolithophores:					
Coccolithus huxleyi	325,520	-	-	-	-
C. pelagicus	-	160	-	-	-
Silicoflagellates:					
Dictyocha fibula	-	-	160	-	-
Distephanus speculum	-	-	720	-	-
Microflagellates	1,540,700	-	-	-	-
Unidentified phytoplankton	-	-	160	-	-

CRUISE: CY-378 STATION: 020 SAMPLE DEPTH: 17 m LATITUDE: 47°07.0'N
 LOCAL TIME AND DATE: 1438 1 April 1978 LONGITUDE: 124°18.0'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Centric diatoms:					
Bacteriastrum	80	-	-	-	-
Chaetoceros	160	-	-	-	-
Coscinodiscus	-	-	320	-	-
Rhizosolenia	-	320	-	-	320
Thalassiosira	80	2,480	800	-	-
Misc. Centrics	14,320	8,560	-	-	-
Pennate diatoms:					
Asterionella	-	240	-	-	-
Navicula/like	80	-	80	-	-
Nitzschia	20,800	6,580	1,200	240	80
Thalassionema/like	-	6,720	6,480	240	-
Misc. Pennates	240	8,240	4,640	1,120	80
Dinoflagellates:					
Amphidinium/Oxytoxum	-	240	-	-	-
Gonyaulax/Peridinium	-	160	80	-	-
Gymnodinium/Gyrodinium	76,960	31,280	2,160	640	-
Coccolithophores:					
Coccolithus huxleyi	289,680	-	-	-	-
C. pelagicus	-	800	-	-	-
Silicoflagellates:					
Distephanus speculum	-	160	240	80	-
Microflagellates	638,600	-	-	-	-
Unidentified phytoplankton	240	640	-	-	-

CRUISE: CY-378 STATION: 021 SAMPLE DEPTH: 10 m LATITUDE: 47°07.0'N

LOCAL TIME AND DATE: 1048 1 April 1978

LONGITUDE: 124°15.0'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Centric diatoms:					
Chaetoceros	-	-	480	-	-
Coscinodiscus	-	160	2,880	160	-
Rhizosolenia	-	-	320	-	-
Thalassiosira	-	3,040	5,280	320	-
Pennate diatoms:					
Asterionella	-	-	-	640	-
Navicula/like	-	-	960	160	-
Nitzschia	18,720	480	800	320	-
Pleurosigma/Gyrosigma	-	-	-	-	160
Thalassionema/like	-	4,000	10,720	3,520	-
Misc. Pennates	960	2,880	7,520	480	-
Dinoflagellates:					
Gymnodinium	112,160	20,960	-	-	-
Gyrodinium	5,120	3,520	-	-	-
Peridinium	-	-	320	-	-
Coccolithophores:					
Coccolithus huxleyi	450,560	-	-	-	-
C. pelagicus	-	1,440	-	-	-
Misc. Coccolithophores	160	-	-	-	-
Silicoflagellates:					
Distephanus speculum	-	-	320	-	-
Microflagellates	423,120	10,320	-	-	-
Unidentified phytoplankton	-	14,240	1,600		

CRUISE: CY-678 STATION: 007 SAMPLE DEPTH: 1 m LATITUDE: 47°07.0'N

LOCAL TIME AND DATE: 0907 10 June 1978 LONGITUDE: 125°45.0'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Centric diatoms:					
Bacteriastrum	-	1,100	100	-	-
Chaetoceros	100	2,300	-	-	-
Coscinodiscus	-	-	-	-	200
Rhizosolenia	-	-	-	200	-
Thalassiosira	-	-	300	-	-
Pennate diatoms:					
Navicula/like	-	-	-	200	-
Nitzschia	600	100	-	-	200
Thalassionema/like	-	100	-	100	-
Misc. Pennates	-	400	1,000	200	-
Dinoflagellates:					
Gymnodinium	35,000	12,000	-	-	-
Gyrodinium	900	1,700	-	-	-
Oxytoxum	-	-	100	-	-
Coccolithophores:					
Coccolithus huxleyi	4,000	-	-	-	-
Misc. Coccolithophores	200	200	-	-	-
Microflagellates	384,420	-	-	-	-

CRUISE: CY-678 STATION: 010 SAMPLE DEPTH: 20 m LATITUDE: 47°07.0'N

LOCAL TIME AND DATE: 1710 10 June 1978 LONGITUDE: 125°23.5'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Centric diatoms:					
Bacteriastrum	80	-	-	-	-
Thalassiosira	-	-	80	-	-
Pennate diatoms:					
Nitzschia	240	-	-	-	-
Thalassionema/like	-	-	80	-	-
Misc. Pennates	-	80	80	-	-
Unidentified diatoms	-	80	-	80	-
Dinoflagellates:					
Gymnodinium	26,880	19,440	-	-	-
Gyrodinium	800	3,920	-	-	-
Oxytoxum	-	80	2,720	240	-
Prorocentrum	-	-	80	-	-
Coccolithophores:					
Coccolithus huxleyi	3,920	-	-	-	-
C. pelagicus	-	160	-	-	-
Misc. Coccolithophores	160	560	-	-	-
Microflagellates	312,180	28,380	-	-	-

CRUISE: CY-678 STATION: 010 SAMPLE DEPTH: 50 m LATITUDE: 47°07.0'N

LOCAL TIME AND DATE: 1710 10 June 1978

LONGITUDE: 125°23.5'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Centric diatoms:					
Bacteriastrum	80	-	-	-	-
Pennate diatoms:					
Thalassionema/like	-	-	-	80	80
Misc. Pennates	-	-	80	-	-
Dinoflagellates:					
Gymnodinium	18,960	4,400	-	-	-
Gyrodinium	480	2,880	-	-	-
Oxytoxum	-	-	2,480	80	-
Coccolithophores:					
Coccolithus huxleyi	4,320	-	-	-	-
Microflagellates	121,260	-	-	-	-

CRUISE: CY-678 STATION: 012 SAMPLE DEPTH: 20 m LATITUDE: 47°07.0'N

LOCAL TIME AND DATE: 2045 10 June 1978 LONGITUDE: 125°09.0'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Centric diatoms:					
Rhizosolenia	-	-	-	-	80
Pennate diatoms:					
Navicula/like	-	-	-	80	-
Nitzschia	80	80	-	-	80
Misc. Pennates	-	-	160	-	-
Unidentified diatoms	-	320	80	-	-
Dinoflagellates:					
Gymnodinium	34,320	13,920	240	-	-
Gyrodinium	3,440	5,520	-	-	-
Oxytoxum	-	-	1,520	-	-
Prorocentrum	-	-	320	-	-
Coccolithophores:					
Coccolithus huxleyi	11,440	-	-	-	-
Misc. Coccolithophores	80	-	-	-	-
Microflagellates	387,000	80	-	-	-

CRUISE: CY-678 STATION: 012 SAMPLE DEPTH 30 m LATITUDE: 47°07.0'N

LOCAL TIME AND DATE: 2045 10 June 1978

LONGITUDE: 125°09.0'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Centric diatoms:					
Rhizosolenia	-	160	-	-	-
Thalassiosira	-	-	80	-	-
Pennate diatoms:					
Nitzschia	160	400	-	-	-
Misc. Pennates	-	80	160	160	-
Unidentified diatoms	-	240	-	-	-
Dinoflagellates:					
Gymnodinium	84,400	11,520	-	-	-
Gyrodinium	9,440	1,920	-	-	-
Oxytoxum	-	-	480	-	-
Prorocentrum	-	-	80	-	-
Coccolithophores:					
Coccolithus huxleyi	6,400	-	-	-	-
C. pelagicus	-	80	-	-	-
Misc. Coccolithophores	240	-	-	-	-
Microflagellates	113,520	159,960	-	-	-

CRUISE: CY-678 STATION: 013 SAMPLE DEPTH: 50 m LATITUDE: 47°07.0'N

LOCAL TIME AND DATE: 2220 10 June 1978 LONGITUDE: 125°01.7'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Dinoflagellates:					
Gymnodinium	6,000	2,000	-	-	-
Gyrodinium	-	240	-	-	-
Coccolithophores:					
Coccolithus huxleyi	1,280	-	-	-	-
Silicoflagellates:					
Distephanus speculum	-	-	80	-	-
Microflagellates	136,740	5,160	-	-	-

CRUISE: CY-678 STATION: 014 SAMPLE DEPTH: 20 m LATITUDE: 47°07.0'N

LOCAL TIME AND DATE: 0447 11 June 1978 LONGITUDE: 124°54.4'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Dinoflagellates:					
Amphidinium	-	-	240	-	-
Gymnodinium	17,360	4,720	-	-	-
Gyrodinium	240	1,040	-	-	-
Oxyluxum	-	80	2,080	-	-
Coccolithophores:					
Coccolithus huxleyi	9,680	-	-	-	-
Microflagellates	276,060	8,060	-	-	-

CRUISE: CY-678 STATION: 016 SAMPLE DEPTH: 20 m LATITUDE: 47°07.0'N

LOCAL TIME AND DATE: 0825 11 June 1978 LONGITUDE: 124°40.0'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Centric diatoms:					
Bacteriastrum	-	160	-	-	-
Chaetoceros	240	320	3,040	-	-
Coscinodiscus	-	-	80	-	-
Rhizosolenia	80	80	960	160	80
Thalassiosira	-	-	480	80	-
Pennate diatoms:					
Asterionella	-	-	-	160	-
Nitzschia	4,560	80	80	-	320
Thalassionema/like	-	-	160	-	-
Misc. Pennates	-	80	160	80	-
Dinoflagellates:					
Gymnodinium	115,040	4,080	-	-	-
Gyrodinium	480	400	-	-	-
Oxytoxum	-	80	-	-	-
Coccolithophores:					
Coccolithus huxleyi	114,640	-	-	-	-
C. pelagicus	-	560	-	-	-
Silicoflagellates:					
Distephanus speculum	-	-	80	-	-
Microflagellates	420,540	-	-	-	-

CRUISE: CY-678 STATION: 016 SAMPLE DEPTH: 25 m LATITUDE: 47°07.0'N

LOCAL TIME AND DATE: 0825 11 June 1978

LONGITUDE: 124°40.0'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Centric diatoms:					
Coscinodiscus	-	-	-	-	160
Rhizosolenia	-	-	640	-	480
Pennate diatoms:					
Asterionella	-	-	-	-	320
Navicula/like	-	-	160	-	-
Nitzschia	240	1,680	560	240	80
Thalassionema/like	-	-	80	240	-
Misc. Pennates	-	880	160	-	-
Dinoflagellates:					
Gymnodinium	42,800	5,600	-	-	-
Gyrodinium	2,880	1,200	-	-	-
Coccolithophores:					
Coccolithus huxleyi	94,240	-	-	-	-
C. pelagicus	-	720	-	-	-
Microflagellates	903,000	-	-	-	-

CRUISE: CY-678 STATION: 017 SAMPLE DEPTH: 25 m LATITUDE: 47°07.0'N

LOCAL TIME AND DATE: 0940 11 June 1978

LONGITUDE: 124°32.5'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Centric diatoms:					
Bacteriastrum	360	2,760	240	-	-
Chaetoceros	28,200	184,620	55,800	2,520	-
Corethron	-	-	120	-	-
Coscinodiscus	-	-	120	240	-
Coscinosira	-	-	120	-	-
Ditylum	-	-	-	480	120
Lauderia	-	480	2,520	480	120
Rhizosolenia	-	8,160	24,240	4,800	16,560
Skeletonema	960	2,400	2,280	-	-
Thalassiosira	-	840	35,010	19,680	-
Pennate diatoms:					
Asterionella	-	-	-	-	148,800
Nitzschia	1,320	4,560	15,960	33,480	43,680
Pleurosigma	-	-	-	-	360
Thalassionema/like	-	-	360	720	120
Misc. Pennates	-	240	1,560	240	-
Dinoflagellates:					
Ceratium	-	-	-	-	480
Gymnodinium	80,040	39,480	480	-	-
Gyrodinium	120	3,600	-	-	-
Peridinium	-	-	360	480	120
Coccolithophores:					
Coccolithus huxleyi	32,760	-	-	-	-
C. pelagicus	-	840	-	-	-
Misc. Coccolithophores	840	840	-	-	-
Silicoflagellates:					
Distephanus speculum	-	-	240	-	-
Microflagellates	670,800	-	-	-	-

CRUISE: CY-678 STATION: 020 SAMPLE DEPTH: 13 m LATITUDE: 47°07.0'N
 LOCAL TIME AND DATE: 1830 11 June 1978 LONGITUDE: 124°18.1'W

Numbers in table are cells/liter

	<10 μ m	10-20 μ m	20-40 μ m	40-70 μ m	>70 μ m
Centric diatoms:					
Bacteriastrum	200	12,900	800	-	-
Chaetoceros	500	39,900	3,900	-	-
Corethron	-	-	200	-	-
Coccinodiscus	-	300	700	300	100
Ditylum	-	-	-	-	600
Lauderia	-	-	200	-	-
Rhizosolenia	-	-	900	900	7,900
Skeletonema	1,300	1,200	-	-	-
Thalassiosira	-	1,600	6,300	1,400	-
Pennate diatoms:					
Asterionella	-	-	-	5,900	1,100
Gyrosigma	-	-	-	-	100
Navicula/like	-	-	-	100	-
Nitzschia	400	200	1,700	800	3,600
Pleurosigma	-	-	-	-	100
Thalassionema/like	-	-	200	-	-
Thalassiothrix	-	-	-	-	400
Misc. Pennates	-	500	900	200	-
Dinoflagellates:					
Gymnodinium	39,600	20,200	-	-	-
Gyrodinium	800	2,200	-	-	-
Peridinium	-	-	100	-	-
Coccolithophores:					
Coccolithus huxleyi	98,000	-	-	-	-
C. pelagicus	-	100	-	-	-
Microflagellates	239,940	-	-	-	-

CRUISE: CY-678 STATION: 021 SAMPLE DEPTH: 20 m LATITUDE: 47°07.0'N

LOCAL TIME AND DATE: 1410 11 June 1978

LONGITUDE: 124°15.0'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Centric diatoms:					
Bacteriastrum	400	1,360	480	-	-
Chaetoceros	4,080	44,400	3,840	-	-
Corethron	-	-	80	-	-
Coscinodiscus	-	160	1,120	640	80
Ditylum	-	-	-	-	160
Lauderia	-	-	160	-	-
Rhizosolenia	-	-	-	560	10,880
Thalassiosira	-	320	5,040	1,200	-
Pennate diatoms:					
Asterionella	-	-	-	5,440	6,720
Fragilaria	-	1,200	-	-	-
Nitzschia	640	80	560	3,200	3,280
Pleurosigma	-	-	-	-	240
Thalassionema/like	-	-	80	80	240
Misc. Pennates	-	-	880	80	-
Dinoflagellates:					
Ceratium	-	-	-	-	80
Gymnodinium	46,240	22,240	160	-	-
Gyrodinium	480	1,520	-	-	-
Peridinium	-	-	-	-	80
Coccolithophores:					
Coccolithus huxleyi	71,760	-	-	-	-
C. pelagicus	-	80	-	-	-
Misc. Coccolithophores	-	80	-	-	-
Silicoflagellates:					
Distephanus speculum	-	-	80	-	-
Microflagellates	516,000	-	-	-	-

CRUISE: CY-978 STATION: 007 SAMPLE DEPTH: 25 m LATITUDE: 47°08.4'N

LOCAL TIME AND DATE: 1900 7 September 1978 LONGITUDE: 125°42.9'W

Number in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Centric diatoms:					
Coscinodiscus	-	-	80	160	-
Pennate diatoms:					
Nitzschia	-	-	-	400	-
Thalassionema	-	-	320	=	-
Misc. Pennates	160	-	240	240	-
Dinoflagellates:					
Gymnodinium	11,280	2,320	-	-	-
Gyrodinium	160	720	-	-	-
Coccolithophores:					
Coccolithus huxleyi	18,640	-	-	-	-
Microflagellates	232,200	-	-	-	-

CRUISE: CY-978 STATION: 008 SAMPLE DEPTH: 1 m LATITUDE: 47°07.0'N

LOCAL TIME AND DATE: 2020 7 September 1978 LONGITUDE: 125°37.5'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Pennate diatoms:					
Thalassionema	-	-	80	-	-
Dinoflagellates:					
Ceratium	-	-	-	-	160
Gymnodinium	6,320	2,560	-	-	-
Gyrodinium	80	320	-	-	-
Coccolithophores:					
Coccolithus huxleyi	4,400	-	-	-	-
Microflagellates	108,360	7,740	-	-	-

CRUISE: CY-978 STATION: 008 SAMPLE DEPTH: 60 m LATITUDE: 47°07.0'N

LOCAL TIME AND DATE: 2020 7 September 1978 LONGITUDE: 125°37.5'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Centric diatoms:					
Coscinodiscus	-	-	80	-	-
Pennate diatoms:					
Nitzschia	-	160	560	320	400
Misc. Pennates	-	80	-	80	-
Dinoflagellates:					
Gymnodinium	9,360	3,840	240	-	-
Gyrodinium	320	2,320	880	-	-
Oxytoxum	-	240	240	-	-
Peridinium	-	-	-	80	-
Prorocentrum	-	-	-	160	-
Coccolithophores:					
Coccolithus huxleyi	2,560	-	-	-	-
C. pelagicus	80	720	-	-	-
Silicoflagellates:					
Distephanus speculum	-	-	160	80	-
Microflagellates	87,720	15,480	-	-	-

CRUISE: CY-978 STATION: 010 SAMPLE DEPTH: 75 m LATITUDE: 47°07.0'N

LOCAL TIME AND DATE: 0040 11 September 1978 LONGITUDE: 125°22.8'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Centric diatoms:					
Coccinodiscus	-	-	-	80	-
Rhizosolenia	-	-	-	320	-
Pennate diatoms:					
Thalassionema	-	-	-	480	-
Dinoflagellates:					
Gymnodinium	4,160	1,040	-	-	-
Gyrodinium	80	80	-	-	-
Coccolithophores:					
Coccolithus huxleyi	1,120	-	-	-	-
C. pelagicus	-	720	-	-	-
Silicoflagellates:					
Distephanus speculum	-	160	320	-	-
Ebria tripartita	-	-	400	-	-
Microflagellates	46,440	10,320	-	-	-

CRUISE: CY-978 STATION: 012 SAMPLE DEPTH: 25 m LATITUDE: 47°07.0'N

LOCAL TIME AND DATE: 2250 10 September 1978 LONGITUDE: 125°08.0'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Centric diatoms:					
Chaetoceros	80	-	-	-	-
Pennate diatoms:					
Nitzschia	400	320	-	400	320
Thalassionema/like	-	80	240	80	-
Misc. Pennates	-	-	320	240	-
Dinoflagellates:					
Amphidinium	-	-	320	-	-
Gymnodinium	21,120	3,840	80	-	-
Gyrodinium	480	1,360	160	-	-
Oxytoxum	-	-	240	-	-
Prorocentrum	-	-	-	80	-
Coccolithophores:					
Coccolithus huxleyi	5,600	-	-	-	-
C. pelagicus	-	80	-	-	-
Misc. Coccolithophores	-	1,120	-	-	-
Microflagellates	121,260	160	-	-	-

CRUISE: CY-978 STATION: 012 SAMPLE DEPTH: 40 m LATITUDE: 47°07.0'N

LOCAL TIME AND DATE: 2250 10 September 1978 LONGITUDE: 125°08.0'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Centric diatoms:					
Bacteriastrum	80	160	-	-	-
Thalassiosira	-	-	80	-	-
Pennate diatoms:					
Navicula/like	-	-	80	240	-
Nitzschia	19,280	3,440	3,040	160	640
Thalassionema/like	-	80	240	160	-
Misc. Pennates	400	5,520	2,000	240	80
Dinoflagellates:					
Amphidinium	-	160	720	-	-
Gymnodinium	36,640	11,440	1,440	-	-
Gyrodinium	2,000	4,240	1,440	-	-
Oxytoxum	-	320	3,840	160	-
Prorocentrum	-	-	80	-	-
Coccolithophores:					
Coccolithus huxleyi	9,520	-	-	-	-
C. pelagicus	-	480	-	-	-
Misc. Coccolithophores	-	1,040	160	-	-
Silicoflagellates:					
Ebria tripartita	-	-	160	-	-
Microflagellates	358,620	33,540	-	-	-

CRUISE: CY-978 STATION: 014 SAMPLE DEPTH: 50 m LATITUDE: 47°07.0'N

LOCAL TIME AND DATE: 2055 10 September 1978 LONGITUDE: 124°53.2'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Pennate diatoms:					
Nitzschia	-	-	240	720	400
Dinoflagellates:					
Gymnodinium	8,400	3,920	-	-	-
Gyrodinium	240	720	-	-	-
Oxytoxum	-	-	480	-	-
Coccolithophores:					
Coccolithus huxleyi	1,920	-	-	-	-
C. pelagicus	-	560	-	-	-
Microflagellates	72,240	30,960	-	-	-

CRUISE: CY-978 STATION: 15A SAMPLE DEPTH: 40 m LATITUDE: 47°07.0'N

LOCAL TIME AND DATE: 1115 10 September 1978 LONGITUDE: 124°50.0'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Centric diatoms:					
Chaetoceros	-	80	-	-	-
Corethron	-	-	80	-	-
Coscinodiscus	-	80	80	-	-
Pennate diatoms:					
Asterionella	-	-	-	-	80
Nitzschia	160	-	560	1,520	-
Thalassionema/like	-	240	160	400	-
Misc. Pennates	-	400	720	320	-
Dinoflagellates:					
Gymnodinium	20,640	2,880	-	-	-
Gyrodinium	160	640	-	-	-
Coccolithophores:					
Coccolithus huxleyi	11,920	-	-	-	-
C. pelagicus	-	160	-	-	-
Microflagellates	165,120	7,740	-	-	-

CRUISE: CY-978 STATION: 016 SAMPLE DEPTH: 1 m LATITUDE: 47°07.0'N

LOCAL TIME AND DATE: 1905 10 September 1978 LONGITUDE: 124°38.4'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Centric diatoms:					
Coscinodiscus	-	-	80	-	-
Pennate diatoms:					
Navicula/like	-	-	-	80	80
Nitzschia	1,280	960	2,240	5,120	2,960
Thalassionema	-	-	-	400	-
Misc. Pennates	-	80	320	240	-
Dinoflagellates:					
Amphidinium	-	160	960	-	-
Gymnodinium	53,520	9,920	240	-	-
Gyrodinium	1,440	1,200	240	-	-
Oxytoxum	-	160	800	-	-
Prorocentrum	-	-	-	160	-
Coccolithophores:					
Coccolithus huxleyi	35,920	-	-	-	-
C. pelagicus	-	160	-	-	-
Misc. Coccolithophores	-	1,880	-	-	-
Microflagellates	518,580	51,280	-	-	-

CRUISE: CY-978 STATION: Q18 SAMPLE DEPTH: 5 m LATITUDE: 47°07.0'N

LOCAL TIME AND DATE: 1725 10 September 1978 LONGITUDE: 124°25.2'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Centric diatoms:					
Corethron	-	-	-	160	-
Pennate diatoms:					
Nitzschia	-	80	-	2,080	640
Thalassionema	-	-	160	80	-
Misc. Pennates	-	-	480	-	-
Dinoflagellates:					
Gymnodinium	66,480	19,280	480	-	-
Gyrodinium	2,560	2,800	320	-	-
Oxytoxum	-	-	400	-	-
Peridinium	-	-	80	-	-
Coccolithophores:					
Coccolithus huxleyi	60,000	-	-	-	-
C. pelagicus	-	240	160	-	-
Misc. Coccolithophores	-	1,040	-	-	-
Silicoflagellates:					
Ebria tripartita	-	-	-	80	-
Microflagellates	381,840	7,740	-	-	-

CRUISE: CY-978 STATION: 020 SAMPLE DEPTH: 10 m LATITUDE: 47°07.0'N

LOCAL TIME AND DATE: 1420 10 September 1978 LONGITUDE: 124°17.2'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Centric diatoms:					
Bacteriastrum	-	720	-	-	-
Chaetoceros	640	49,360	16,320	1,600	-
Coscinodiscus	-	-	1,040	720	240
Ditylum	-	-	-	-	80
Eucampia	-	-	-	1,440	-
Lauderia	-	-	320	-	-
Rhizosolenia	-	-	5,760	2,880	320
Thalassiosira	-	-	1,680	-	-
Pennate diatoms:					
Asterionella	-	-	-	320	35,120
Nitzschia	-	80	320	-	560
Thalassionema	-	-	640	3,200	-
Misc. Pennates	-	-	640	-	-
Dinoflagellates:					
Ceratium	-	-	-	-	240
Gymnodinium	20,400	6,400	-	-	-
Gyrodinium	1,200	2,640	-	-	-
Oxytoxum	-	-	80	-	-
Peridinium	-	-	80	-	80
Coccolithophores:					
Coccolithus huxleyi	4,320	-	-	-	-
Silicoflagellates:					
Distephanus speculum	-	-	1,200	240	-
Microflagellates	286,380	38,700	-	-	-

CRUISE: CY-978 STATION: 020 SAMPLE DEPTH: 21 m LATITUDE: 47°07.0'N

LOCAL TIME AND DATE: 1420 10 September 1978 LONGITUDE: 124°17.2'W

Numbers in table are cells/liter

	<u><10 μm</u>	<u>10-20 μm</u>	<u>20-40 μm</u>	<u>40-70 μm</u>	<u>>70 μm</u>
Centric diatoms:					
Bacteriastrum	320	2,720	-	-	-
Chaetoceros	5,840	15,040	15,600	400	-
Coscinodiscus	-	160	640	400	160
Ditylum	-	-	-	-	640
Eucampia	-	-	-	2,000	480
Rhizosolenia	-	-	7,120	14,960	-
Skeletonema	1,600	3,200	560	-	-
Stephanopyxis	-	-	-	720	-
Thalassiosira	-	-	800	640	-
Pennate diatoms:					
Asterionella	-	-	-	-	22,080
Gyrosigma	-	-	-	-	400
Nitzschia	-	240	720	320	480
Thalassionema	-	160	800	2,000	240
Misc. Pennates	-	240	400	-	-
Dinoflagellates:					
Ceratium	-	-	-	80	800
Gymnodinium	28,080	11,760	-	-	-
Gyrodinium	720	1,200	-	-	-
Oxytoxum	-	-	-	160	-
Coccolithophores:					
Coccolithus huxleyi	9,440	-	-	-	-
C. pelagicus	-	240	-	-	-
Silicoflagellates:					
Distephanus speculum	-	-	400	1,360	-
Microflagellates	335,400	15,480	-	-	-

Sediment Trap Experiments

Table 1 gives a brief synopsis of the deployment history and the data obtained for this series of sediment trap experiments. Only the results of the pigment flux (phaeophorbide a) are available at the time. The calculation of flux rate is made as follows:

$$\text{Flux (mg/m}^2\text{/d)} = \frac{[\text{pigment in trap } (\mu\text{g/l})][\text{volume of trap (l)}]}{[\text{mouth area of trap (m}^2\text{)}][\text{exposure time (d)}][1000 \mu\text{g/mg}]}$$

Several standard CTD profiles and hydrographic casts were done in conjunction with these sediment trap experiments. Data from those casts are also presented in this section in the same tabular and graphical form used above for the transect stations.

Table 1. Deployment history of sediment traps set out during cruises CY-378, CY-678, and CY-978.

Cruise & Station	Location	Deployment Time & Date	Recovery Time & Date	Water Depth	Days Open	Phaeopigment Flux mg (m ² ·day ⁻¹)
CY-378: 15A, 15B, 15C	47-07.3N 124-50.2W	0700, 3/31/78	1200, 4/4/78	142 m	4.2	*
CY-678: A15, 15A	47-07.4N 124-50.4W	0700, 6/9/78	0930, 6/13/78	141 m	4.0	0.369 (F ₀ /F _a ≈1.1)
CY-978: A15, 15A	47-07.0N 124-50.0W	0800, 9/7/78	1000, 9/10/78	146 m	4.0	0.021** (F ₀ /F _a ≈1.5)

* Due to technical difficulties, data are not available for this experiment.

** The low flux rate and relatively high F₀/F_a ratio probably indicate that the traps were flushed out prior to closing, perhaps due to the severe storm during the cruise.

STD PLOT
CY378 15A

Latitude 47-07.3N
Longitude 124-30.3W
Program run: PLOT, RELUC, WINDT

T = Temperature - C
S = Salinity - 0/00
D = Sigma-t
F = S-V or Chlorophyll
File MN315A

Date 2 APR. 1976
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-----CRUISE CY378

STATION 15A-----

DATE 02 APR 78 SECCHI 10.0M WIND SPD 14KT BARMETER 1009.2MB CLOUD TYPE: ALTOCUMULUS
 TIME 1520(+08) PHOTIC 27.0M DIR 240 AIR DRY 10.5C AMOUNT: 100%
 LAT 47-07.3N SUN AM LY WAVE HGT 3M WET 9.5C WEATHER: UNBROKEN CLOUD LAYER
 LON 124-50.3W PM LY DIR 260 REL HUMIDITY 88% VISIBILITY: 20-50KM
 DEPTH 143M TOTAL 364LY PER 6SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS	SIL	NO3	NO2	NH3	CHLA	PHAED	FO/FA
				MGAT/L	ML/L	SAT	ADU	---MICROGRAM---	---ATOMS/LITER---				---MG/M3---		
0.0	10.47	30.941	23.73	.654	7.33	114	-.081	.30	3.54	.28	.01	.30	.31	.05	1.69
10.0	10.38	31.275	24.01	.651	7.28	114	-.078	.34	3.13	.27	.01	.06	.70	.03	1.77
15.0	10.19	31.934	24.55	.651	7.29	114	-.078	.40	2.80	.26	.01	.00	1.08	.03	1.78
20.0	10.08	32.037	24.65	.644	7.21	112	-.070	.40	2.98	.41	.01	.00	.92	.06	1.75
25.0	10.04	32.083	24.69	.641	7.17	112	-.067	.44	3.11	.55	.01	.00	.85	.04	1.77
30.0	9.99	32.176	24.77	.642	7.19	112	-.067	.42	3.10	.54	.01	.00	.73	.01	1.79
40.0	9.88	32.343	24.92	.626	7.01	109	-.051	.49	2.76	.83	.05	.03	.71	.08	1.71
50.0	9.84	32.493	25.04	.609	6.82	106	-.034	.59	3.47	1.80	.25	.00	.51	.04	1.74
75.0	9.36	32.559	25.17	.587	6.57	101	-.006	.66	4.93	3.23	.27	.00	.13	.08	1.49
100.0	9.21	32.636	25.26	.571	6.40	98	.012	.81	8.55	6.19	.26	.00	.04	.08	1.26
(9-27.0M)													20.58	1.09MG/M2	

SEDIMENT TRAP STATION

STD PLOT
CY378 15B

T = Temperature - C
S = Salinity - ‰
D = Sigma-t

F = S-Y or Chlorophyll

Latitude 47-07.3N
Longitude 124-30.3W
Program run: PLOTD, ATLAS, RMST

File MN315B

Date 2 APR. 1978
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-----CRUISE CY378 STATION 15B-----

DATE 02 APR 78 SECCHI 10.0M WIND SPD KT BARMETER MB CLOUD TYPE:
 TIME 1925(+08) PHOTIC 27.0M AIR DRY C AMOUNT: %
 LAT 47-07.3N SUN AM LY WAVE HGT M WET C WEATHER:
 LON 124-50.3W PM LY DIR REL HUMIDITY % VISIBILITY:
 DEPTH 142M TOTAL 364LY PER SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----			PHOS	SIL	NO3	NO2	NH3	CHLA	PHAEO	FO/FA	
				MGAT/L	ML/L	SAT	AOU	---MICROGRAM---	ATCMS/LITER---			---MG/M3---			
0.0	10.49	31.041	23.81					.31	3.73	.00	.00	.09	.35	.00	1.80
10.0	10.24	31.893	24.51					.37	2.89	.00	.03	.06	.75	.06	1.74
15.0	10.03	32.057	24.67					.39	2.41	.00	.00	.06	.85	.06	1.75
20.0	10.01	32.135	24.74					.46	2.54	.31	.00	.11	.90	.05	1.76
25.0	10.00	32.169	24.77					.53	3.00	1.15	.09	.24	.61	.06	1.73
30.0	9.96	32.252	24.84					.64	4.06	2.13	.35	.13	.38	.06	1.68
40.0	9.81	32.468	25.03					.68	5.14	3.26	.34	.01	.21	.07	1.60
50.0	9.78	32.517	25.07					.68	5.07	3.46	.21	.02	.22	.04	1.68
75.0	9.27	32.576	25.20					.78	7.29	5.10	.25	.00	.05	.07	1.35
100.0	8.82	32.937	25.53					1.18	16.64	12.39	.08	.03	.05	.12	1.23
(0- 27.0M)													18.78	1.27MG/M2	

SEDIMENT TRAP STATION

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-----CRUISE CY378 STATION 15C-----

DATE 04 APR 78 SECCHI 15.0M WIND SPD 16KT BAROMETER 1010.5MB CLOUD TYPE: CUMULUS
 TIME 0725(+08) PHOTIC 40.5M DIR 220 AIR DRY C AMOUNT: 60%
 LAT 47-07.0N SUN AM LY WAVE HGT 2M WET C WEATHER: PARTLY CLOUDY
 LON 124-50.0W PM LY DIR 220 REL HUMIDITY % VISIBILITY: 20-50KM
 DEPTH 142M TOTAL 432LY PER 6SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN----- MGAT/L ML/L SAT ADU	PHOS ---MICROGRAM---	SIL ---ATOMS/LITER---	NO3	NO2	NH3	CHLA ---MG/M3---	PHAEO	FO/FA
1.0		32.035			.39	2.36	.05	.00	.00	.39	.05	1.71
4.5		32.036			.37	2.36	.05	.00	.00	.56	.02	1.77
8.0		32.038			.39	2.31	.05	.00	.00	.58	.01	1.79
15.0		32.039			.39	2.55	.17	.03	.00	.44	.04	1.74
29.0		32.115			.48	2.65	.48	.05	.08	.34	.13	1.58
(0- 40.5M)										16.99	3.09MG/M2	

C-14 CHLA PHAEO FO/FA				-----SIMULATED IN SITU-----			
DEPTH M	---MG/M3---			LIGHT DEPTH %	-CARBON ASSIM- LIGHT DARK MG/M3/(INCUB*)	ASSIM/CHLA MG/MG/(HR OF LIGHT)	
1.0	.39	.05	1.71	100.	41.15	1.73	5.99
4.5	.56	.02	1.77	50.	66.93	1.04	6.78
8.0	.58	.01	1.79	25.	68.96	1.89	6.75
15.0	.44	.04	1.74	10.	65.55	.72	8.46
29.0	.34	.13	1.58	1.	3.13	.96	.52
(0- 40.5M)	16.99	3.09MG/M2			1437.64MGC/M2/(INCUB*)		

SAMPLES INCUBATED FROM 0725, 4 APRIL TO 1200, 5 APRIL, INCLUDING
 17.62 HR. OF DAYLIGHT.
 1% LIGHT DEPTH BASED ON SECCHI DISK READING
 SALINITIES ESTIMATED FROM CTD DOWNCAST

STD PLOT
CY378 15C

T = Temperature - C
S = Salinity - 0/00
D = Sigma-t
F = S-V or Chlorophyll

Latitude 47-07.0N

Longitude 124-30.0W

Program run: PLOTD, RT, AD, PRINT, EDIT, RENDT

File MN315C

Date 4 APR. 1978

Begin 1035

-----CRUISE CY378

STATION 15C-----

DATE 04 APR 78 SECCHI 15.0M WIND SPD 16KT BARMETER 1010.5MB CLOUD TYPE: CUMULUS
 TIME 1017(+08) PHOTIC 40.5M DIR 220 AIR DRY C AMOUNT: 60%
 LAT 47-07.0N SUN AM LY WAVE HGT 2M WET C WEATHER: PARTLY CLOUDY
 LON 124-50.0W PM LY DIR 220 REL HUMIDITY % VISIBILITY: 20-50KM
 DEPTH 142M TOTAL 432LY PER 6SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL O/OO	SIG-T	-----OXYGEN-----				PHOS	SIL	NO3	NO2	NH3	CHLA	PHAEO	FO/FA
				MGAT/L	ML/L	SAT	AOU	---	---	ATOMS/LITER---	---	---	MG/M3---	---	---
0.0	10.21	32.036	24.63	.632	7.08	110	-.060	.38	2.42	.01	.04	.00	.46	.02	1.76
10.0	10.20	32.037	24.63	.623	6.97	109	-.051	.40	2.42	.00	.04	.12	.55	.00	1.79
15.0	10.18	32.039	24.63	.633	7.09	111	-.060	.42	2.43	.00	.04	.01	.54	.03	1.75
20.0	10.18	32.035	24.63	.637	7.14	111	-.064	.43	2.64	.18	.04	.00	.36	.04	1.72
25.0	10.12	32.079	24.68	.611	6.84	107	-.038	.47	2.72	.41	.08	.00	.32	.06	1.67
30.0	10.05	32.129	24.73	.630	7.05	110	-.056	.49	2.79	.46	.12	.21	.33	.12	1.59
40.0	9.82	32.382	24.96	.602	6.74	105	-.026	.68	5.03	3.08	.11	.21	.25	.09	1.58
50.0	9.54	32.462	25.07	.628	7.03	108	-.049	.63	3.24	2.00	.17	.45	.15	.08	1.53
75.0	9.26	32.578	25.20	.604	6.77	104	-.022	.79	6.86	5.04	.24	.15	.07	.09	1.37
100.0	8.95	32.825	25.45	.484	5.42	83	.101	1.36	18.99	14.77	.22	.00	.04	.10	1.21
(0-40.5M)													16.37	2.14MG/M2	

SEDIMENT TRAP DEPLOYED ON 30 MARCH 1978 RETRIEVED AT THIS STATION

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-----CRUISE CY678 STATION A15-----

DATE 09 JUN 78 SECCHI 12.0M WIND SPD KT BAROMETER MB CLOUD TYPE:
 TIME 0430(+07) PHOTIC 32.0M AIR DRY C AMOUNT: %
 LAT 47-08.0N SUN AM LY WAVE HGT M WET C WEATHER:
 LON 124-50.0W PM LY DIR SEC REL HUMIDITY % VISIBILITY:
 DEPTH 145M TOTAL 550LY PER SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----			PHOS	SIL	NO3	NO2	NH3	CHLA	PHAED	FO/FA
				MGAT/L	ML/L	SAT	AQU	---MICROGRAM---	---ATOMS/LITER---			---MG/M3---		
1.0		31.774						.28	.89	.00	.00	.10	.01	1.75
5.0		31.776						.27	.89	.00	.00	.12	.00	1.83
10.0		31.789						.27	1.02	.12	.00	.09	.01	1.77
16.0		31.782						.37	1.08	.00	.00	.13	.01	1.79
32.0		32.231						.39	4.69	.00	.00	.09	.05	1.69
(0- 32.0M)												8.77	.60MG/M2	

				-----SIMULATED IN SITU-----			
C-14 DEPTH M	CHLA ---MG/M3---	PHAED	FO/FA	LIGHT DEPTH %	-CARBON ASSIM- LIGHT DARK MG/M3/(INCUB*)	ASSIM/CHLA MG/MG/(HR OF LIGHT)	
1.0	.11	.01	1.75	100.	27.12	.57	15.34
5.0	.12	.00	1.83	50.	30.45	.57	15.79
10.0	.13	.01	1.77	25.	21.60	.30	10.34
16.0	.42	.01	1.79	10.	72.29	1.06	10.71
32.0	.32	.05	1.69	1.	7.37	.76	1.43
(0- 32.0M)	8.77	.60MG/M2			1191.34MGC/M2/(INCUB*)		

SAMPLES INCUBATED FROM 0715, 9 JUNE TO 0730, 10 JUNE, INCLUDING
 16.07 HR. OF DAYLIGHT.
 SALINITIES DETERMINED FROM WATER BOTTLE SAMPLES.
 SEDIMENT TRAPS DEPLOYED AT THIS STATION RETRIEVED ON 13 JUNE 1978

STD PLOT
CY678 15A

T = Temperature - C
S = Salinity - g/kg
D = Sigma-t
F = S-V or Chlorophyll

Latitude 47-07.7N
Longitude 124-30.5E
Program run: MCTD, PLOT

File MNS15A

Date 12 JUNE 1978
Bath 1620

-----CRUISE CY678

STATION 15A-----

DATE 12 JUN 78 SECCHI 22.0M WIND SPD 7KT BARMETER 1016.5MB CLOUD TYPE: STRATOCUMULUS
 TIME 1845(+07) PHOTIC 59.0M DIR 210 AIR DRY C AMOUNT: 50%
 LAT 47-07.7N SUN AM LY WAVE HGT 2M WET C WEATHER: SHOWERS
 LON 124-50.3W PM LY DIR 230 REL HUMIDITY % VISIBILITY: 20-50KM
 DEPTH 145M TOTAL 361LY PER 6SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----			PHOS	SIL	NO3	NO2	NH3	CHLA	PHAEO	FO/FA
				MGAT/L	ML/L	SAT	AOU	---MICROGRAM---	ATOMS/LITER---			---MG/M3---		
2.0	14.17	31.979	23.84									.09	.01	1.75
5.0	14.17	31.980	23.84									.10	.00	1.80
10.0	14.15	31.980	23.85									.09	.00	1.84
20.0	13.65	32.009	23.97									.14	.01	1.75
30.0	10.98	32.391	24.77									.17	.00	1.83
40.0	9.77	32.488	25.05									.32	.01	1.78
51.0	8.92	32.618	25.29									.27	.00	1.79
73.0	8.03	32.940	25.67									.08	.01	1.70
99.0	7.50	33.440	26.14									.02	.02	1.33
123.0	6.84	33.847	26.55									.05	.18	1.16

SEDIMENT TRAPS WERE RETRIEVED AT THIS STATION.

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-----CRUISE CY678 STATION 15A-----

DATE 12 JUN 78 SECCHI 22.0M WIND SPD 7KT BARMETER 1016.5MB CLOUD TYPE: STRATOCUMULUS
 TIME 1930(+07) PHOTIC 59.0M DIR 210 AIR DRY C AMOUNT: 50%
 LAT 47-07.7N SUN AM LY WAVE HGT 2M WET C WEATHER: SHOWERS
 LON 124-50.3W PM LY DIR 230 REL HUMIDITY % VISIBILITY: 20-50KM
 DEPTH 145M TOTAL 361LY PER 6SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN----- MGAT/L ML/L SAT	AQU	PHOS ---MICROGRAM---	SIL ---ATOMS/LITER---	NO3	NO2	NH3	CHLA ---MG/M3---	PHAEO	FO/FA
1.0		31.978				.32	3.38	.00	.05	.00	.09	.00	1.80
9.0		31.979				.33	3.46	.00	.04	.12	.11	.01	1.73
18.0		32.037				.33	3.26	.00	.03	.05	.14	.01	1.77
30.0		32.330				.40	4.90	.00	.03	.04	.21	.01	1.77
58.0		32.625				.89	9.45	8.27	.03	.04	.27	.00	1.83
(0- 59.0M)											11.11	.39MG/M2	

C-14				-----SIMULATED IN SITU-----			
DEPTH M	CHLA ---MG/M3---	PHAEO	FO/FA	LIGHT DEPTH %	-CARBON ASSIM- LIGHT DARK MG/M3/(INCUB*)	ASSIM/CHLA MG/MG/(HR OF LIGHT)	
1.0	.09	.00	1.80	100.	29.28 .88	20.63	
9.0	.11	.01	1.73	50.	34.66 .74	19.98	
18.0	.14	.01	1.77	25.	40.39 .54	18.29	
30.0	.21	.01	1.77	10.	44.54 1.09	13.45	
58.0	.27	.00	1.83	1.	3.79 .35	.89	
(0- 59.0M)	11.11	.39MG/M2			1810.86MGC/M2/(INCUB*)		

SAMPLES INCUBATED FROM 2100, 12 JUNE TO 2030, 13 JUNE, INCLUDING
 16.05 HR. OF DAYLIGHT.
 SALINITIES DETERMINED FROM WATER BOTTLE SAMPLES.

-----CRUISE CY978

STATION A15-----

DATE 07 SEP 78 SECCHI 11.0M WIND SPD GKT BARMETER 1010.3MB CLOUD TYPE: CUMULUS
 TIME 0400(+07) PHOTIC 30.0M DIR HGT 2M AIR DRY C AMOUNT: 30%
 LAT 47-07.0N SUN AM LY WAVE DIR 320 REL HUMIDITY % WEATHER: UNBROKEN CLOUD LAYER
 LON 124-50.0W PM LY PER 7SEC SURF TEMP C VISIBILITY: 20-50KM
 DEPTH 146M TOTAL 457LY TIDE: M

DEPTH M	TEMP C	SAL O/CO	SIG-T	OXYGEN----- MGAT/L ML/L SAT ADU	PHOS ---MICROGRAM---	SIL ---ATOMS/LITER---	NO3	NO2	NH3	CHLA ---MG/M3---	PHAED ---	FO/FA
1.0		31.957			.19	4.69	.13	.00	.00	.37	.04	1.73
8.0		32.143			.21	3.44	.12	.00	.00	.25	.02	1.74
15.0		32.198			.21	3.38	.20	.00	.00	.33	.04	1.72
22.0		32.273			.48	6.68	2.68	.06	.48	.94	.07	1.74
50.0		32.800			1.31	16.00	14.42	.07	.00	.12	.06	1.52
(0-30.0M)										15.60	1.39MG/M2	

C-14				SIMULATED IN SITU-----			
DEPTH M	CHLA ---MG/M3---	PHAED ---	FO/FA	LIGHT %	-CARBON MG/M3/(INCUB*)	ASSIM- DARK	ASSIM/CHLA MG/MG/(HR CF LIGHT)
1.0	.37	.04	1.73	100.	34.76	.85	7.23
8.0	.25	.02	1.74	50.	25.84	.77	7.89
15.0	.33	.04	1.72	25.	13.22	.80	3.06
22.0	.94	.07	1.74	10.	20.46	.66	1.66
50.0	.12	.06	1.52	1.	.58	.30	.37
(0-30.0M)	15.60	1.39MG/M2			642.41MG/M2/(INCUB*)		

SAMPLES INCUBATED FROM 0545, 7 SEPTEMBER TO 0530, 8 SEPTEMBER,
 INCLUDING 13.10 HR. OF DAYLIGHT.
 SALINITIES DETERMINED FROM WATER BOTTLE SAMPLES.

-----CRUISE CY978 STATION A15-----

DATE 07 SEP 78 SECCHI 11.0M WIND SPD OKT BAROMETER 1010.3MB CLOUD TYPE: CUMULUS
 TIME 0855(+07) PHOTIC 29.7M DIR AIR DRY C AMOUNT: 30%
 LAT 47-07.0N SUN AM LY WAVE HGT 2M WET C WEATHER: UNBROKEN CLOUD LAYER
 LON 124-50.0W PM LY DIR 320 REL HUMIDITY % VISIBILITY: 20-50KM
 DEPTH 146M TOTAL 457LY PER 7SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL 0/00	SIG-T	-----OXYGEN----- MGAT/L ML/L SAT	AGU	PHOS ---MICROGRAM-ATOMS/LITER---	SIL	NO3	NO2	NH3	CHLA ---MG/M3---	PHAEO	FO/FA
1.0											.52	.05	1.73
6.0											.53	.05	1.73
15.0											.43	.00	1.82
20.0											1.33	.07	1.76
25.0											1.37	.00	1.81
30.0											1.59	.02	1.79
40.0											.64	.07	1.72
45.0											.25	.10	1.57
55.0											.15	.06	1.57
75.0											.06	.14	1.24
100.0											.04	.13	1.21
(0- 29.7M)											25.54	.92MG/M2	

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SEDIMENT TRAPS DEPLOYED AT THIS STATION RECOVERED ON 10 SEPT. 1978

STD PLOT CY978 015

Latitude 97-07.0N
Longitude 129-50.0W
Program run: NSCTD, R000T

File NS015X

Date 13 SEP. 1978
Begin 1130

STD PLOT CY978 015

Latitude 97-07.0N
Longitude 129-50.0W
Program run: NSCTD, R000T

File NS015X

Date 10 SEP. 1978
Begin 1100

-----CRUISE CY978

STATION 15A-----

DATE 10 SEP 78 SECCHI 22.0M WIND SPD 10KT BAROMETER 1007.8MB CLOUD TYPE: CUMULUS
 TIME 1115(+07) PHOTIC 59.4M DIR 200 AIR DRY C AMOUNT: 60%
 LAT 47-07.0N SUN AM LY WAVE HGT 2M WET C WEATHER: PARTLY CLOUDY
 LON 124-50.0W PM LY DIR 270 REL HUMIDITY % VISIBILITY: 20-50KM
 DEPTH 133M TOTAL LY PER 6SEC SURF TEMP C TIDE: M

DEPTH M	TEMP C	SAL O/00	SIG-T	-----OXYGEN-----				PHOS	SIL	NO3	NO2	NH3	CHLA	PHAEO	FO/FA
				MGAT/L	ML/L	SAT	AQU	---MICROGRAM---	---ATOMS/LITER---				---MG/M3---		
1.0	15.64	32.107	23.63	.565	6.33	111	-.055	.29	3.36	.14	.05	.19	.36	.02	1.76
9.0	15.56	32.103	23.64	.565	6.33	111	-.054	.34	3.36	.14	.05	.20	.35	.02	1.75
20.0	15.47	32.100	23.66	.560	6.27	109	-.048	.37	3.49	.14	.04	.15	.37	.09	1.64
25.0	14.82	32.096	23.80	.556	6.23	107	-.037	.38	4.65	.88	.08	.15	.61	.05	1.74
29.0	13.89	32.198	24.07	.543	6.09	103	-.015	.52	7.64	2.90	.21	.59	.64	.03	1.76
40.0	10.58	32.601	25.00	.450	5.03	80	-.116	1.31	22.45	12.39	.58	2.04	.26	.04	1.69
50.0	8.37	32.639	25.55	.459	5.14	77	.134	1.59	24.52	18.69	.27	.06	.08	.14	1.29
60.0	7.87	32.984	25.73	.430	4.81	72	.170	1.72	26.25	20.53	.15	.05	.05	.14	1.21
76.0	7.50	33.366	26.08	.374	4.19	62	.229	1.97	33.93	25.02	.07	.00	.04	.17	1.15
101.0	7.29	33.715	26.39	.310	3.48	51	.294	2.11	39.80	28.67	.06	.03	.02	.05	1.21
(0-59.4M)													19.38	3.90MG/M2	

SEDIMENT TRAP STATION

Appendix 1

Continuous oxygen profile for cruise CY-978

The algorithm for oxygen includes terms for pressure, salinity, and temperatures of the water and of the oxygen probe. There is a fast response sensor in the CTD to measure water temperature, but a slow response sensor in the oxygen probe itself. The algorithm uses the difference between these two measurements as part of the equation. The algorithm was based on one developed by Stan Hayes (Pacific Marine Environmental Lab/NOAA, Seattle, Washington), with coefficients empirically determined, based on titrated oxygen data from cruises in the study area.

$$O_2 \text{ (ml l}^{-1}\text{)} = O_{2satn} \times O_{2rel}$$

where O_{2satn} is the saturation value of dissolved oxygen at the measured temperature and salinity, based on Weiss (1970),

and O_{2rel} is the relative oxygen concentration at depth, related to the sensor signal by the following algorithm

$$= \left(\frac{C_1}{0.331} \right) e^{(-0.0335T + 0.000145P)}$$

C_1 = O_2 sensor reading = 0.0005 (sensor frequency) - 0.002

T = $T_{CTD} + 0.75 (T_{OXY} - T_{CTD})$

P = pressure in decibars

T_{CTD} = temperature from fast response sensor

T_{OXY} = temperature from slow response sensor

Because the algorithm includes a term based on the difference between the two sensors which have markedly different response times, the algorithm is sensitive to passage of the CTD through a thermocline in either direction. On a normal downcast, the O_2 sensor agrees well with dissolved oxygen titration values in the mixed layer, overestimates concentration within and below the thermocline, and again shows better agreement deeper in the water column as the slow response sensor "catches up" with the fast response one. Thus, the oxygen traces presented in this report should be interpreted with caution. They should be considered to represent trends rather than absolute concentrations.

Appendix 2

Participating personnel

The following table lists the scientific personnel who participated in these cruises, the institutions they were affiliated with at the time, and the duties they were principally involved with during the cruises. The institutions have been abbreviated as follows:

UW = Department of Oceanography, WB-10
University of Washington
Seattle, Washington 98195

OSU = School of Oceanography
Oregon State University
Corvallis, Oregon 97331

People involved in scientific watch duties participated in the standard CTD and hydrographic casts in addition to any special experiments they performed.

<u>Name</u>	<u>Institution</u>	<u>Duties</u>
<u>CY-378</u>		
Mary Jane Perry	UW	Senior Scientist; ^{15}N uptake and associated measurements
Will Peterson	UW	Cruise Leader; scientific watch
Jim Postel	UW	^{15}N uptake and associated measurements
Serena Campbell	UW	Watch Chief; autoradiography; ^{14}C uptake
Sean Chamberlin	UW	Scientific watch
Bess Ward	UW	Scientific watch
Chris Campbell	UW	Scientific watch
Rich McKinney	UW	Current meters; scientific watch (aboard 30 March - 2 April)
Randy Shuman	UW	Sediment traps (aboard 2-5 April)

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Mary Jane Perry	UW	Senior Scientist; ^{15}N uptake and associated measurements
Jim Postel	UW	^{15}N uptake and associated measurements
Charles Levitan	UW	^{15}N uptake and associated measurements
Serena Campbell	UW	Watch Chief; ^{14}C uptake
John Dohrmann	UW	Scientific watch
Will Peterson	UW	Cruise Leader; scientific watch

CY-978

Mary Jane Perry	UW	Senior Scientist; ^{15}N uptake and associated measurements
Will Peterson	UW	Cruise Leader
Jim Postel	UW	^{15}N uptake
Serena Campbell	UW	Watch Chief; ^{14}C uptake
Bess Ward	UW	Scientific watch
Mary Kay Larson	UW	Scientific watch
David Menzies	OSU	CTD; optics